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WHAT WE ARE AND WHY



NORMAL IN EVERY CYCLE OF LIFE

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WHAT WE ARE AND WHY

A Study with illustrations, of the Relation of the Endocrine Glands to Human Conduct and Dispositional Traits, with Special Reference to the Influence of Gland Derangements on Behavior

By

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and

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Sears Publishing Company, Inc.
New York



WHAT WE ARE AND WHY

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TO OUR PICTURED FRIENDS
WHOSE PATIENCE AND COÖPERATION
MADE THIS BOOK POSSIBLE

PREFACE

THE science of endocrinology, while the development of less than half a century, offers no better proof of its importance and interest than is to be found in the great and growing mass of literature that has accumulated around it. We have drawn on this literature as was desirable or convenient and always with gratitude to those who have pioneered and are still pioneering in this alluring field of study, research and experiment. Our particular thanks are due Dr. R. G. Hoskins, who has not only summarized endocrine knowledge in his "Tides of Life," but has added to it.

Entrance into the field of endocrine psychology is venturesome, but the illustrative cases presented are ample justification for even a greater adventure. They bring the consequences of glandular derangements to popular comprehension no less than

to medical judgment, and it is our hope that they may have some influence in warding off from gland victims the opprobrium which they so often receive. It has been the work of many years to accumulate and authenticate the records in these cases whose clinical histories have often been far from short, but whose psychological histories have always been long.

To our medical friends, for their encouragement and for their critical and helpful reading of the manuscript, we are especially grateful.

THE AUTHORS.

Chicago,
September, 1933.

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WHAT WE ARE AND WHY

CHAPTER I

NORMAL AND ABNORMAL

EVERYONE feels that he is not merely a thing of flesh and blood—a physical human organism—that at the end is returned to the dust from which it came. There are some, it is true, who believe exactly that and others who profess to believe it, but the idea of a complete ending with the final dissolution is generally abhorrent to the mind. We flatter ourselves, perhaps, but the vast majority of us think, and we all like to think, that life has some purpose beyond merely living; that Creation would be aimless if its only end were its own perpetuation.

The immortality of the soul—that is, the question of a life after death—has stirred up arguments

which never come to settlement; but generally we come to admit that there is an intangible, invisible essence which may be called the soul, that it is indestructible and permanent, and that it is during life housed in the physical organism. We don't know the location and it is not important, but it is the part that thinks and reasons. *Cogito ergo sum* are the three words that have summed up the entire question for thousands of years. They will likely continue to do so for an indefinite time to come.

There is plainly a connection between this thinking, motivating center and the body. I can say to my arm, strike, and it strikes. I say to my legs, walk, and they walk. My arms and my legs respond to my will. So do those of every other animal. But there are muscles and organs which do not respond to my will—parts with whose operations and functions I have nothing to do. There are others whose operating and functioning I can control partially or temporarily. These parts over which I have

partial control or no control, however, go on operating and functionating whether I like it or not. They may vary their operations within a certain range, according to the demands I make upon them. They rebel if the demands are too great. They make me stop or slow up if I overtax the organs and functions which they control and regulate. However, they do much more than that. The more they are studied and observed, the plainer it becomes that I am their product. I am, in fact, entirely subject to their control. They make me exactly what I am, not only physically but mentally and temperamentally—that is, psychically. They create my personality. They supply the chemicals which are essential to life and they determine the chemical correlation which is not only essential to life, but *is* life.

Chemical control is undoubtedly the means whereby the various organs and parts of the body are brought to develop and work in harmony. We must not, however, bow in complete humility at

the shrine of chemistry. Chemistry has made marvelous progress and is now going forward at increasing speed, but chemistry has not yet discovered the difference between a fecundated and an unfecundated egg.

Three-quarters of a century ago, Trousseau explained that difference in these words:

"Take two eggs, laid by the same hen with an interval of some days between them, the one having received, and the other not having received, the fecundating influence of the male. I beg the ablest chemist to tell me what analysis will tell him the difference between these two eggs. In both there is albumen, fat, earthy phosphates, chlorides and a little iron. Has the chemist discovered wherein consists the chemical and physical difference between those two eggs? Will he admit with me, and with everybody else, that their composition is identical? There is, however, a very small difference, quite insignificant, the chemist tells us: they say that one is organic matter, endowed with

a property which, for want of a better name, we call life.

"Let us, nevertheless, see how each egg is affected by the same influences. We place them below a hen under exactly the same conditions as to light, temperature and moisture. In a few days, the non-fecundated egg, obeying the laws of dead organic matter, will be putrescent, while the other will contain a contractile tube filled with blood. A few days later, this minute vessel will consist of four compartments, separated by valves, and will become a heart, receiving and sending forth blood through separate channels. The calcareous phosphates will take their appointed places, lengthening out as jointed levers, moulded as cavities or extended as plates. The albumen will be distributed in the blood, muscles, parenchyma and membranes: the iron and salts will take their own special and predetermined places. * * *

"That which strikes me as most remarkable in the fecundated egg, as well as in the fully formed

animal, is not so much the complex chemical combinations which take place at so small a cost of effort, as the elective affinities which manifest themselves. In the amorphous albuminous mass which we call the egg, each principle, without any straying, takes it proper place. Here, we have the calcareous phosphates and there, the phosphorous, the fatty matters, the fibrine, the hair and nails, all finding their places with an order and method which clearly demonstrates the existence of properties different from those of inorganic matter or dead organic matter. Again, in that living organism, the fecundated egg, chemical actions which are all decreed, regular and of unerring perfection, concur in promoting one object: but in the non-fecundated egg there is chance, and that chaos of chemical reactions which manifests itself in dead organic matter. Chemistry plays its part in both instances but that part is very different in each. We must admit that there are special properties in the one case because in it there are special results."

The order and "unerring perfection" of the process of composition and growth as contrasted with the chaotic process of decomposition, is set forth by Trousseau with masterly simplicity and clarity. The vital principle is no less a mystery today than it was when he wrote, but now we know that in the human animal, the "unerring perfection" results from the control of the endocrine glands.

The composition and development of the human body must be understood in a general way if there is to be appreciation of the work of the endocrine glands. This delicate and intricate body mechanism is an assemblage of many billions of living cells. Each one of these cells lives a life of its own: it is born, it performs its functions and dies. During the space of its existence it performs a threefold labor, that is, it absorbs nourishment, it multiplies and it carries out the particular tasks assigned to it by nature.

The body can be healthy only if all the cells are healthy. An abnormal condition in any part of

the body is the result of an abnormal condition in the cells. This may come from a wide variety of causes, among them, disease and injury. The latter, so far as the endocrine glands are concerned, is disease.

The great organization of billions of cells develops from a single one—the germ cell. The female germ cell, or ovum, is pierced by the male germ cell, or spermium. Thus fertilized, the ovum divides into two cells, the two divide into four, the four into eight, and so on. These multiplied and multiplying cells congregate with relentless precision, under the impulse of what Trousseau designated as the "elective affinities," to build themselves into the various and varying structures which form the different parts of the body—brain, eyes, bones, muscles, teeth, nerves, glands, membranes, etc. Once these formations have taken place and the cells have selected and congregated themselves, they, with the exception of the blood corpuscles, cannot move about. They are station-

ary and receive their nourishment from the bloodstream and lymph stream.

It is plain that the health of the cells depends on the condition of the blood and the lymph, that is, on the nourishment they receive. As the life of the body is maintained by breathing, eating and drinking, every cell in the body must receive its exact share of what is absorbed. It it does, it reciprocates by supplying the body with the particular energy it was meant to contribute—exactly so much—no more and no less.

The cells of the body and, therefore, the body, will sicken and die unless properly and adequately nourished. They will, of course, be affected by harmful nourishment. If the bloodstream or the lymph stream is filled with deleterious matter, such as toxins from infectious diseases, pus from some local infection or poisons derived from drugs or alcohol, the cells suffer and their functions become deranged. They multiply too little or too much and so the normal growth of the body in

childhood is retarded or stimulated, or in adults, the functioning of the organs is impaired. Thus it appears that formative disturbances come in early life and functional disturbances after maturity.

It seems somewhat paradoxical that medical science has a better understanding of the development of the human body before birth, while it is still invisible, than it has afterwards. It is true, nevertheless. Every stage of the nine months of growth has been elaborately studied and classified. Every change can be predicted with comfortable accuracy.

From the day of birth until maturity, however, individuals differ in their development. There are all kinds of variants and variations. Influences come from without as well as from within. Many of them are unseen and unknown, but they have a share in affecting the intricate mechanism that functions during growth, and afterwards, for that matter. But the growth period brings its own interruptions, and its peculiar susceptibilities.

The first movements of the babe are instinctive. They are the reactions to fundamental emotions. Crying when in pain, suckling the nipple, jumping at a sudden noise, squirming when tickled are such reactions.

The changes in the infant that come with growth make their appearance on a definite schedule. The first teeth appear, continue to increase in number and mothers are quick to note variations from the schedule. Teeth bring with them a change of countenance. Jaws become strong and muscle develops. The bones of the head and face grow and take form. The child increases the radius of its movements: it creeps and then walks. It begins to take note of objects and its own surroundings. It absorbs impressions. Gradually it becomes coördinated. From instinctive, its movements become purposeful.

This development and growth are regulated, predetermined and the process is exact and orderly, just as the development of the fecundated

egg was orderly. The growth impulse is effective now in one place and now in another. It comes and goes. It begins and ceases. It appears again and again until it stops at maturity. Why? The query as to the cause of growth will bring no answer save Trousseau's: the vital principle, *life,* is present. What is the force or agent that makes the schedules, regulates the periods, inhibits or delays one activity and begins and stimulates another? To this question the answer is: The endocrine glands.

The hormones or internal secretions of these glands control, in the words of Barker, "our stature, the kind of faces we have, the length of our arms and legs, the shape of the pelvis, the color and consistency of our integument, the quantity and regional location of our fat, the amount and distribution of hair on our bodies, the tonicity, the sound of the voice, and the size of the larynx, and the emotions to which we give expression. We are, in a sense, the beneficiaries and the victims

of the chemical correlations of our endocrine organs."

This catalogue of the influences of endocrine operations is by no means complete. Omitting for the minute the disastrous consequences that accompany disturbance of the endocrines and their secretions, there is the entire range of variations in human personality which seems to depend on them. They regulate growth and make us what we are physically—tall or short, fat or thin, long-necked or short-bodied, lean and lank, dense and rotund—but they also, directly or indirectly, make us smart or stupid, eager or backward, ambitious or reticent, forward or shy, venturesome or cowardly, and they do all of these when functioning harmoniously and healthily so that neither the physical nor the psychical structure is out of balance or abnormal as the result of disease or glandular impairment. The endocrines supply us with all the natural or instinctive urges. They keep us in balance physically and through their control of

the physical they control our emotions and our emotional reactions. Beyond this, only the recklessly bold may venture. At this point we can only have recourse, like Trousseau, to the "very small difference, quite insignificant" which endows organic matter "with a property which, for want of a better name, we call life," and which, in the psychical and emotional realm, endows man with what, for want of a better name, we call soul, spirit or, perhaps, mind.

If it is a correct statement to say that without chemical correlation there can be no life, it is apparently correct to say that personality, the peculiarities of physical and psychical make-up which distinguish one individual from another, is developed, regulated and controlled by the same force, or that the distinctions between individuals result from variations in chemical correlation.

The regulating and controlling forces are the glands of the body and, more particularly, the endocrine glands whose function is to secrete in the

blood a substance which plays an important rôle in metabolism, or healthy life; more particularly still, five or six and not more than eight of these glands. If these glands operated always and everywhere in exactly the same way, the chemical correlation would be identical in all cases and, perhaps, we would all be precisely alike physically and emotionally, and it would be a very stupid and uninteresting world.

It is the present assumption that study of the variation in glandular activities and reactions will bring us to a better understanding of the causes which underlie human behavior and of the variations in personality. The studies will be reinforced by illustrations and cases of glandular aberrations.

There is neither suggestion nor implication in these pages that glandular relations and reactions have any bearing on the spiritual life or that chemical correlation is the solution of the great mystery. The ultimate and defensible postulate is that in

them are to be found the roots of human behavior —that their control extends to the emotional as well as the physical centers. Any gain in the understanding of the drive that urges men to action or inaction must necessarily promote satisfaction and increase tolerance of the behavior of others.

In a plant growing by the roadside there is a challenge to curiosity. To one it may be an expression of divine crafstmanship and inspire veneration. In another its form and flowering may awaken admiration. To one botanically inclined it may suggest relationships or similarities to other plants and invite comparison, description and classification. But the biologist, who may appreciate all the other inspirations and be far from devoid of imagination, will see in the plant a chemical laboratory which changes what is drawn from soil and air into root and stalk, leaf and blossom, into varying shapes and hues which form the

whole by processes whose final expression is one of the great and still unsolved mysteries.

But no plant, despite its variegations or the delicacy of its beauty, declares a process that is quite the equal of that which goes on in the factory and laboratory which we call the human body. This factory and laboratory has for its raw materials food, water and air, including sunlight. From these substances comes everything the body gets and needs.

The body, which is a complicated mechanism, has many needs, but it also receives a mass and variety of raw materials from which to get them. Man is omniverous. He eats many different things. His food varies with the seasons, with his environment, with his tastes and inclinations and also with his capacity to pay for it. The water he drinks and the form in which he takes it vary greatly. The air varies also in its contents.

Naturally the amount of food and drink taken into the body is rather great in comparison with

the amount of material that comes from factory and laboratory in form for use. Food, like ore, assays variously in value. A ton of ore may produce an ounce of gold and a ton of spinach may yield only a pinch of mineral salts whose acquirement, by preponderant testimony, is the single reason for eating it.

But whatever the food, the laboratory must go to work on it and the factory must get out of it what it needs and throw the remainder away. The process is called metabolism and its accuracy is almost invariably disturbed if anything goes wrong in the laboratory.

The thought immediately suggests itself that the maximum of coöperation between factory-laboratory and the individual who houses it, would be distinctly advisable. Through mutual understanding and coöperation they should work harmoniously and successfully. But they are usually at variance. The housing department punishes the factory by loading into it all sorts of materials,

and the factory, although a liberal and conscientious worker, occasionally rebels with the result noted in the Jester's Sermon: "The fool that eats till he is sick must fast till he is well."

The housing department is to a slight extent conscious of the work that goes on in the factory, but of what transpires in the laboratory it is in complete ignorance, so long as there is no disturbance and even when there is one. Operations in these deep recesses go on and must go on with all the precision necessary or the housing department will receive notification. The notification is not likely, however, to be direct and, unless subjected to skilled and experienced interpretation, it is likely to be misunderstood or misinterpreted or even completely mistaken. This is not surprising. If the housing department is notified of a leaky roof, it naturally consults a roofer and not a furnace man, although the real trouble may be in the depths and not on the heights. It would simplify matters materially if the disturbance of an en-

docrine gland were manifested by an ache in that particular gland or in the vicinity of it. But disturbance of one gland may cause functional derangement of another that will manifest itself in a metabolic disturbance which will show only in the structure of the bone. The endocrine glands are only apparently independent organs. They form a system the relationships of which are only partly understood, and even when best understood are likely to be baffling.

In the ordinary interplay of glandular efficiency the emotional conduct of the individual will be related to chemical causes. When we read the hardy Scot's defiant

> "Come one, come all, this rock shall fly
> From its firm base as soon as I,"

we are likely to think that there is a self-confident, courageous or reckless man and not that nature has endowed him with a hard-working pituitary gland, thereby equipping him for courage or reck-

less conduct. We will not consider that, when he was shouting his defiance, the adrenal glands, nestling down atop his kidneys, had become quickly active and poured a surplusage of perhaps two milligrams (the weight of four mosquitoes) of adrenin into the bloodstream, thereby causing his liver to discharge an extra supply of sugar (glycogen) into his blood, to the end that he might have all the muscular strength possible to support his challenge. As a result, with discretion scattered to the four winds, the boastful gentleman might get a broadsword through his gullet in compensation for his emotional stress. But probably not. The little laboratories astride his kidneys are not interested in how he uses his strength. He may use it in flight as well as in fight, so far as they are concerned; it is the pituitary that has prompted him to strut and bluster. Thus the two glands have contributed their functions to his emotional state and they have also contributed to his emotional structure, as will appear later.

A complete emotional structure is a delicately balanced affair. It grows and develops under glandular regulation and functions under the same direction. We say customarily that human conduct or behavior is the visible emotional reaction to external influences or the reaction to internal notifications. An external influence might be a man with a gun and the emotional reaction would be fear or anger. An internal notification might come from the digestive tract and the reaction might be hunger or thirst. All our "feelings" and acts are the results of emotions, but emotion, in these respects, is a misused word.

Emotional manifestations are normal or abnormal and the abnormal may be supernormal or subnormal. Normal emotional reactions are those that find their origin in a balanced emotional structure. The word "emotional," of itself, contains no implication of the degree of the reaction. It is misleading to use it as an unqualified term of description of the conduct of an individual or a group of

individuals, as is often done. Emotional people, or merely emotional persons, are those whose emotional reactions are normal, whose emotional structure is balanced. In common parlance, by "emotional person" is meant one who is over-emotional. If attempt were made to describe one whose emotional reactions were subnormal, the inclination would be to say, "Oh, he is emotionless" or "she has no emotions." In scientific terminology, neither statement is correct and both are misleading. Our defiant Scot, broadcasting his challenge to one and all, seems to have rather an excess of emotion; he seems to be supernormal. The apocryphal "lord high executioner" or a professional hangman or a murderous and murdering gangster is under-emotional, that is, subnormal. None of these reacts to distress. Any one of them can chop or hunt or kill with complete personal indifference. Each is unmoved by sight of suffering, tolerant of misery and anguish and undoubtedly hard and cruel. The emotional status is much loved by

poets who find in it a challenge to their descriptive powers. Cowper says, for instance, that he

"—would not enter on my list of friends
(Though graced with polished manners and fine sense,
Yet wanting sensibility) the man
Who needlessly sets foot upon a worm."

One might be inclined to exclude the worms and still agree that Cowper had the right idea. "Wanting sensibility" is quite as effective in description as "subnormal emotional reaction," and far more resonant.

Scientifically, then, we may classify ourselves thus:

We are normally emotional, or we possess an over-abundance of emotion; or we suffer from an under-supply to the point of sterility.

Emotional characters in the drama are over-emotional.

The villain of the melodrama is under-emotional.

The plain, everyday, plodding citizen is merely emotional.

It is a long emotional distance between the extremes, with many gradations—an infinite number and variety of shades. In fact, the shadings are so blurred and run together that one's emotions may cover a rather wide range without departure in classification from normal.

We all have "tempers." We become angry for various reasons or for no reason. We maintain the state or condition of anger for different periods of time and then recover our equanimity. It can hardly be classed as an abnormal reaction, although it stirs several endocrine glands into activity, exercises the adrenals unnecessarily and turns into the bloodstream secretions which are not consumed in the activity that the anger threatens. But if we fly into a paroxysm of rage, manifest it by floods of words and silly actions, or if we never show resentment or become wholesomely angry, we are undoubtedly abnormal.

Extreme variation from normal emotional reactions is attributed to alteration or functional impairment of some member or members of the endocrine system.

It would be a happy situation if we could say that a certain disturbance of a certain gland would cause a certain variation in its secretions and that such variation would produce a certain definite result. Such conditions are, unfortunately, few. Certain hormones may be artificially supplied, notably insulin and thyroxine, and adrenalin is a drug used in a variety of ways, but not as a substitute for the hormone of the adrenal glands, so far as we know. But we do know that variations in the supply of the hormones (chemical substances secreted by the glands) result in disturbance whose results come in the form of physical giants at times, but much oftener in the form of emotional giants or monsters, that is to say, persons so controlled by their abnormal emotional reactions that they are unstable, eccentric, erratic, impru-

dent, unreliable, flighty, disturbing, disorganizing, intolerant and intolerable, pernicious, offensive and not infrequently dangerous.

Departures from normal emotional reactions are infinitely varied and the variations from the hypothetical normal run in two directions, up to a high or supernormal, and down to a low or subnormal. In the illustrated cases, pictured and written, extremes are used for emphasis. The abnormalities run a long scale between sub and super. The degrees between these extremes will suggest themselves. To some extent it may be that cases encountered will be easily recognized and, for practical purposes, self-explanatory. Even one who does not know the anatomical location or the special functions of the pituitary gland may, nevertheless, come to understand the pituitary type; he may recognize "exhibitionism" when he sees it and resent it less because he understands or partly understands its causes. So one's sympathy, rather than one's wit, may be stirred by a display of obesity

which seems always to suggest over-indulgence of the appetite, and very often incorrectly. Similarly, temper, conceit, forwardness, desire for leadership, indifference, shyness, stupidity, genius, ambition and other emotional qualities have their causation in glandular action or inaction. The results are marked in intensity by the degree of variation from the norm of human behavior.

It is not surprising that "normal" is difficult to define when we seek for a standard in so varied a thing as human conduct. Webster says that "normal describes the average condition or type." A normal person is, then, an average person, but there are, of course, variations within the boundaries of average. These boundaries, as they are approached, become not lines but misty zones where abnormal meets and merges with normal to raise or lower the average and also to produce perplexities which can be solved only after careful scientific investigation or, in many cases, cannot be solved at all.

The normal in the matter of human behavior is probably uninteresting. It is likely to be dull and commonplace. We must find something beyond normal, something beyond the confines of the average, before our curiosity is aroused and interest becomes keen. In a medical sense, we learn what is normal only from study and observation of the abnormal. Disease, not health, arrests our attention. If the thyroid gland always functioned perfectly, interest in it would be academic only. Physiology is interesting, but it is devoid of the sensations which pathology supplies in full and constant measure. A healthy thyroid is a mere blob of tissue and cells located in the neck. It was nothing more than that for a good many centuries. Then we learned about good thyroids from bad. In struggling for treatment of myxedema and exophthalmic goiter we learned that the thyroid hormone contains iodine, that iodine is indispensable to life and sanity and that each one of us is removed from idiocy by just about two milligrams

of iodine, supplied daily by the thyroid gland. Three and one-half grains is a year's supply. This is less than the weight of a dollar bill.

It is study of the abnormal which brings rewards to investigators. It is the abnormal that is charged with tragedy. It is the abnormal which puzzles science and has appealed to genius as the stew in which may be boiled up startling characters. Job, Hamlet, Quasimodo, Gwynplaine, Lear, Richard III, Louis XI, Richelieu, the Sophoclean heroes and heroines and thousands of others—all unusual, none average, all abnormal. Some have twisted spines and humped backs, some distorted features, some perverted minds; some are pathetic in their distress, some cruel in their conduct. It would not be artistic to explain their behavior in terms of pituitary secretions or adrenal hormones, and the authors or creators of the characters knew nothing about glands, but their creations stand as

the prototypes of the array of the maladjusted which parades through history, literature and folklore. They are examples so far from normal or commonplace that they are worth knowing about. If abnormality were not attractive, we would give no heed to giants or dwarfs, physical or mental, and we would have no such words as hobgoblin, troll, imp, fairy, peri, houri, angel, naiad, nymph, gnome and others whose lure is that they suggest departure from normal or average.

These mythical figures have as counterparts rather more human those who, through special gifts or endowments, perform miracles or act in a miraculous or unusual maner. These include soothsayers, witches, oracles, hermits, crystal gazers, dervishes, pundits, healers, fortune tellers, mind readers and so forth. These, in turn, in degree of public interest invite parallel classification with such freaks as the living skeleton, the ossified man, the Circassian beauty, the Siamese twins, the wild man of Borneo, Jo-Jo, the dog-faced boy, the Seven

Sutherland Sisters, and it is even permissible to include the Missourian who vowed to let his beard grow until Bryan was elected president and, in the end, had his whiskers for a shroud.

It seems idle to say that men are interested in men just as dogs show the most intense interest in dogs. The fact is that we are interested in ourselves, that is to say, in one another. Any departure in any way from normal or average adds a lively curiosity to intense interest.

Most of the abnormals listed above, who actually lived, had sad experiences and unhappy lives. The same is true of the thousands upon thousands whose existence is unrecorded. The world is cruel to those who, through chance or misfortune, fall beyond the pale of the normal or average, whether their aberrations show in physical form or appearance or in mental and moral endowments. Superstition and ignorance have contributed to their ill-treatment. They earned no pity because they were not understood. Lepers were outcasts. The insane

were possessed of devils. Idiots were tormented. Witches were burned.

No change of the general attitude toward the abnormals came until modern times, and methods of treatment and care have been slow to improve. We come slowly to a condition of tolerance. Our indignation yields reluctantly to understanding. Less punishment and more care has been prescribed only by the few whose study has led them to believe that the errors and evils of human kind are present in some more than in others, but are seldom entirely absent in anyone.

It is only within a century that betterment has been marked. Many classifications have been made as scientific knowledge advanced, but institutionalization has found endorsement only in progressive, civilized countries. Diagnosis and treatment still lag and while the long list has been cut down, there is still a large number of variations from normal. These, not being understood, still excite derision rather than pity. The victims carry their

own burdens, hide their griefs and if they do not suffer, it is because the causes that made them ill or deformed or abnormal, also dulled their sensibilities and made them callous to jibes and ridicule.

Imagine, if you can, a salesman, commercially competent and successful, who emerges after a two-year siege with goiter. Fortunately science has succeeded and surgery has brought him back. He has only one visible defect—exophthalmia—protruding eyeballs. He was quickly referred to as "pop-eyed," which soon was turned into the sobriquet, "Pop-eye" and "Pop-eye" he is to friend and stranger. He is deeply hurt that a physical misfortune has been reduced to the humiliation of a designation. He does not complain. He must go on with his business as best he can; he must struggle against the handicap and handicap it surely is.

It has always been so. Misfortunes are turned back against those who bear them through such intensifications. There is, perhaps, no humiliation

in one's being "Fatty" to his intimates, or in a tall man's being "String" or "Skinny" to his friends, but such designations are merely variables of a thousand expressions which are often more devastating when unuttered. Human nature has not changed since the beginning, but science has made vast strides. It is moving forward with increasing speed. It has now become possible in many cases to assign causes, and often to bring correction, for some of the diseases that turn normals into abnormals, that drive average persons over the misty space that bounds them, and that gives us freaks of various kinds to pity or to ridicule according to our understanding or our ignorance.

In his definition of normal Webster continues: "Anything or anyone deviating from normal condition or type is abnormal."

As the deviation may be slight or startling, the difficulty in detection becomes obvious. A man six feet six inches high may be normal, although he is not average, but one eight feet high is surely

abnormal, that is to say, his great height is the result of defective internal organization. The glands that control growth have not functioned normally.

Giants and dwarfs, real and fabled, have always been the objects of curiosity and fascination. Hercules, Samson, Goliath of Goth, Gog and Magog, have left such indelible imprints that they are today common standards of comparison.

For centuries dwarfs were not only universally fascinating, but were regarded with awe and reverence. They were gathered from the four corners of the earth and placed as a necessary fixture in palace and castle to act as court fools and buffoons. The more outlandish their gibberish, the more gnome-like and misshapen their forms and features, the higher their value as a source of amusement and interest. If historical records are true, they were often anything but fools. They knew how to emphasize their physical defects by displaying mental extravagances. They pretended knowledge of the occult. They won reputations

as oracles and soothsayers, thus capitalizing for themselves the superstitions of their times, an art that by no means died with them. It is a mere corollary that at times they exerted a powerful and subtle influence over their masters, promoting scandals and intrigues which overturned thrones and caused widespread disaster.

Giants and dwarfs are placed here as examples because they challenge the men of science as well as the curiosity-seeking public. They are visible, physical specimens of variation from the average. The man of science, eager to find causes or explanations, has, therefore, from time immemorial, studied the structural make-up and speculated on the cause or causes of their aberrations. In modern times he has succeeded to some extent in unveiling the secret of their abnormalities. If a child, at birth, manifests unmistakable symptoms of future unnatural development, the scientist points to a prenatal influence as the cause. If a child is normal at birth and later develops into an abnormal

being, some injury or disease is assigned as the cause of the condition; the organs controlling the normal growth of bones have possibly been impaired or altered and an over- or under-production of bone-forming tissue has resulted.

There exists in our social organization a variety of defectives whose malformations are not visible and are usually unrecognized as variations from average. Not infrequently the person so afflicted is regarded as eccentric or a little freakish. The attributed cause is his own indifference or neglect or stubbornness, or his greed or subservience to habit—anything, in fact, except the real cause. The present effort here is to help the reader to an understanding of these cases, or some of them, that is, to give a basis for judging. This, it is assumed, can be done, although the glands of the human body are themselves only partially understood and several of them are still complete mysteries.

CHAPTER II

ENDOCRINE PHYSIOLOGY

THE ENDOCRINE GLANDS, which seem to perform functions of such vital importance to life, health and mental soundness, are located in the head, the throat and the chest and the abdomen, except the male gonads (sex glands) which are the only ones visible. Some of these glands are paired, some are single and some are compound organs whose parts secrete different hormones (chemical substances which, after absorption in the blood, coördinate certain bodily functions) and whose functioning seems to produce different results at different times and in different places. All the writers mention the glands and their work and influence with reservations. The glandular

organs themselves vary in size at different stages of life and growth and under different conditions. Sometimes one gland or its secretions seem to excite another gland and stimulate its activity. Sometimes one will inhibit or delay the activity of another and apparently withdraw or discontinue the inhibition when the determined time arrives. Some of the endocrines are vital organs whose extirpation causes death; some which are considered of high importance may be removed with impunity, but not without consequential disturbance to emotional balance. All of them are apparently somewhat concerned with metabolic processes and they are in most instances closely related to the autonomic nervous system. And finally they seem so intimately tied together in the matter of functioning, that the results of their joint activities are not always to be separated and attributed to exact sources.

The glands might, theoretically, at least, be classified as to importance, if it were possible first

to agree on what is important, or which is the more important—life or its perpetuation or, say, man and his reproduction. We may say that all of the endocrines are of vital importance. We may say that some are more important than others; but one may not say that none of them is unimportant, even those of whose functions we are in doubt or in ignorance. Of the glands and their functions, relations and connections there is an amazing amount of doubt and an equally amazing amount of ignorance. Still more interesting is the amazing amount that is known.

The glands as parts of human anatomy have been known for centuries, but endocrinology is almost intensely modern. There were speculating articles and discussions before Dr. Thomas Addison, a British clinician, first opened the way by clearly describing the pathologic changes in the adrenal glands which result in what has since been known as Addison's disease, a usually fatal disease characterized by a bronze-like pigmentation of the

skin and progressive anemia. That was in 1855. It was the first time a definite pathological condition was related to a definite gland. Prior to that, certain simultaneous occurrences had been noted, for instance, protruding eyeballs, heart palpitation and swelling of the thyroid gland, but they were not congregated to make the disease now known as exophthalmic goiter.

From the middle of the last century there has been continuous progress and in this century it has been still more rapid, until the constantly growing studies of the endocrines and their hormones form a fascinating and vastly important chapter in the history of medical development.

What and where are the endocrine glands?

Beginning at the top of the corporeal structure, they are the pineal and pituitary in the head; the thyroid and parathyroids in the lower throat; the thymus below the thyroids in the upper part of the chest; the pancreas near the stomach; the adrenals on top the kidney; the ovaries (female gonads)

in the pelvis; the testes (male gonads). The stomach and intestine have certain secretory functions and are sometimes included among the endocrines.

The hormones of the glands are, as has been said, chemical substances. Some of them have been produced synthetically. But it has not yet been determined whether all glands secrete hormones, and the gonads (sex glands) are both endocrine and exocrine—they secrete at least one hormone and excrete another.

The Pituitary Gland

Mindful that the endocrines may not be classified in relation to importance, we will begin with the pituitary gland, or body which is known also as the hypophysis.

The hypophysis or pituitary gland is located almost in the exact center of the head, below the brain. It is the most inaccessible and the most protected of all the glandular organs, as if nature real-

ized its importance. It is composed of two lobes, anterior and posterior, with a cleft between. The anterior lobe is an outgrowth from the embryonic mouth cavity and the posterior develops from a stalk—the infundibulum—which grows down from the brain and ultimately both lobes grow around this stalk to form the pituitary body. The gland is suspended from the under side of the brain and is nested in a bony recess known as the *sella turcica* or Turkish saddle. The gland in its entirety weighs from five to ten grains; it is 0.3 of an inch long and 0.5 wide.

This apparently insignificant bit of tissue plays a highly important part in the glandular system and in the growth, control and regulation of the entire bodily mechanism. The pituitary has intimate relations with adrenals, the gonads (sex glands) and the thyroid, as well as with the placenta when it is present. It is close to the brain and it may supply a secretion which activates certain brain functions.

The anterior lobe is perhaps the more important functionally. Its presence is essential to life. But the essential qualities of the posterior lobe are not to be under-estimated; indeed, the entire organ is about as interesting, alluring, baffling and challenging as any organ of the body. Unfinished and incomplete investigations, varying results of experiments and decidedly scant knowledge, to which, however, there are constant accretions, leave doubts as to all the functions of the gland and its divisions, but there are also definite, proved and accepted points.

The anterior lobe of the gland controls the skeletal growth and, therefore, the height and size. It controls the development of the sexual organs and so exercises a vast, if not conclusive, influence on temperament and behavior. It influences metabolism, particularly the protein, the fat and the water metabolism. It plays an important rôle in pregnancy and parturition, increasing blood pressure, causing contraction of the uterus and prob-

derangements, although the thyroid claims some attention in this field.

To sum up, these five to ten grains of glandular cells and tissue in the head control and regulate *bone-growth, sexual development* and vigor, the *color of the skin, blood pressure, childbirth*; its *derangements or dysfunctions give us giants, dwarfs, acromegalics* (characterized by enlargement of the bones and soft parts of the feet, hands, and face), idiots and geniuses. The activities of the sex glands are regulated by the pituitary which thus becomes an accessory and shares in the vast influence the sex glands exercise on human behavior. Defective pituitary functioning has been related to insanity, but science still has some distance to go before we can come to more than tentative agreement with Berman, who says:

> "We have seen that, more than any other gland or tissue of the body, the post-pituitary governs the maternal sexual instincts and their sublimations, the social and creative in-

stincts. A great deal of evidence is in our possession concerning the disturbances of emotion accompanying disturbances of this gland, and controllable by its control. It might be said to energize deeply the tender emotions, and instead of saying soft-hearted we should say much-pituitarized. . . . The ante-pituitary has been depicted as the gland of intellectuality. . . . The frontal lobes of the brain are the central offices for higher thought. Their cells . . . store the fruits of abstract thinking, mathematics, for example. The anterior pituitary is in the closest relation and contact with them. Its secretion is tonic to them. Now the instinct that is the forerunner of intellectuality is the instinct of curiosity, with its emotion of wonder, and its expression in the various constructive and acquisitive tendencies. Studies of intellectual man, and of those with a keen instinct of curiosity and a constructive acquisitive trend prove them to be ante-pituitary dominant in their make-up."

The Pineal Gland

The pineal gland (*conarium pinealis* or pine cone) is about one-third of an inch long and weighs three grains; it is rather larger than a grain of wheat. It is attached to the brain and is above and near the pituitary. It is larger in children than in adults and begins to decrease in size at about the seventh year. It has very little or no typical gland secreting-tissue, but its blood supply is rich which suggests an active function. Its location all but forbids experimental tests, but it is suggested, as the result of such studies as have been made, that the gland produces a hormone (chemical substance), which has some part in regulating the rate of bodily development and it may defer the onset of puberty.

In some of the lower vertebrates, the pineal is developed and grows out through the skull to form a rudimentary eye. In some lizards the structure is a true eye, having cornea, retina and lens.

Descartes, the seventeenth-century philosopher, having need of an argument for the substantive existence and location of the soul, selected the pineal gland as the seat of it. His assumption was not susceptible of discussion, but modern science is not content with such methods of settling a question. Perhaps we should rejoice that, for the time being, the pineal does not enter to add complications to an already highly complicated question.

THYROID

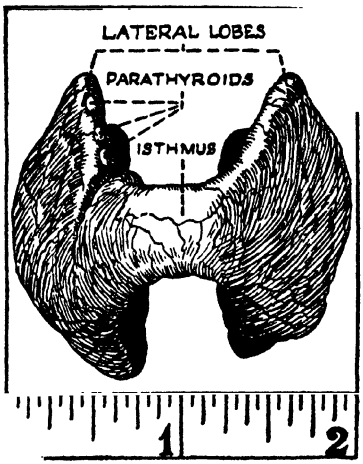
The thyroid gland, located on both sides of the trachea (windpipe), has two lobes which are connected by an isthmus stretching across the front. Its position and size are best shown by the picture on page 57.

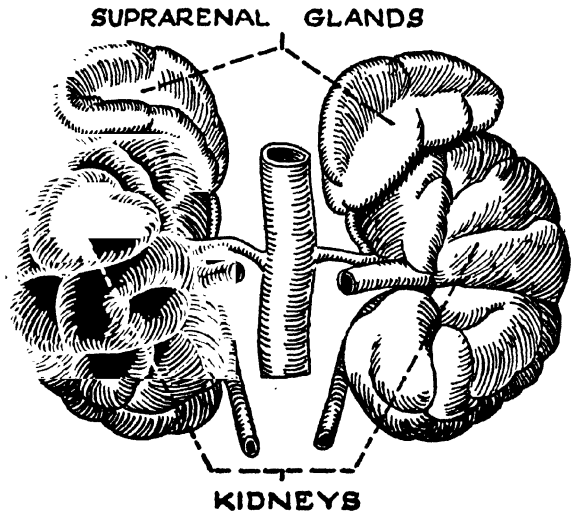
The gland is described as consisting of a framework of connective tissue enclosing numerous vesicles which are lined by granular cubical cells. The cavity of the vesicles is occupied by a homogeneous viscid, iodine-containing material which

is secreted by the lining epithelium (secreting membrane). It has a very liberal supply of blood. The whole volume of blood of the normal human being (in the neighborhood of five liters) passes through the thyroid once an hour; it passes through the kidneys once in five minutes and through the lungs once a minute.

The active principle of the thyroid gland—thyroxine—facilitates the oxidative activities of the body and thus regulates the general level of metabolism.

All of which is to say that the thyroid gland, through its secretion, keeps us in tune with our surroundings. The gland is closely related to other members of the endocrine system. Its own derangements affect the others, particularly the pituitary, the adrenals and the gonads, and their derangements affect the thyroid. The thyroid hormone is essential to health. It is better understood than any other glandular secretion. It is also synthetically produced and is in common use. It is, perhaps, the


LATERAL LOBES
PARATHYROIDS
ISTHMUS
1
2


SUPRARENAL GLANDS
KIDNEYS

only glandular extract, except insulin, which may be used successfully to supply a deficiency and the only one that can be taken orally with success.

The thyroid gland may be diseased and often is. In such cases, it may provide an inadequate hormone supply, hypothyroidism, or an over-supply, hyperthyroidism. The demands of the body are particular, however, and either under- or over-supply causes trouble.

The ailments resulting from disturbance of the gland include cretinism and cretinic idiocy, various kinds of goiter—colloid, myxedema and exophthalmia (eye protruding)—one or more forms of obesity and a long list of consequential perversions, distortions and ailments. Many of these may be corrected, arrested or cured by timely and competent treatment, but it is also true that some of them are discovered belatedly or not at all. Also there are apparent variations from normal in the supply of thyroxine with resultant influences on behavior and temperament. It is this gland which

adapts us to changes in the tempo of living and to a large extent, at least, adjusts us to variations in diet. If it fails even to a slight degree, our adaptability falters and our conduct varies from normal. It is beyond doubt that thyroid inefficiency affects temperament and the capacity to proceed with ordinary affairs in a normal way. It is one of the most important glands, has a place in every syndrome and is so intimately related to mental health and balance that it comes in for particular study by the physiological psychiatrists. The perfectly normal human is carried through the trials of puberty with the aid of the thyroid. None of us is farther removed from idiocy than a tiny bit of thyroxine. We may, however, doubt the assertions of some students that the thyroid alone regulates the personality and the variations thereof; that we have a "thyroid type" of individual, because, in the case of such persons, we have no evidence that they receive more than the normally correct share of thyroxine, and there are other glands of such

efficiency that they very likely exert a regulatory influence on the thyroid.

Parathyroids

The parathyroid glands are four in number and, as their name indicates, they lie close against the thyroid, two on either side, and are sometimes buried in the thyroid tissues. Until rather recent times—about fifty years—the parathyroids were regarded as fragments of the thyroid. They caused confusion and disaster in early thyroid surgery for this reason, until their independent functional status was discovered.

Removal of the parathyroids by surgery causes a condition known as tetany, cramps in the muscles and sometimes a progressive lethargy that ends in death. Parathyroid extract is successfully made and its use increases the calcium content of the blood. The parathyroids, therefore, have a relationship to bone metabolism, we are told. There is agreement that the parathyroid hormone is nec-

essary to health, but it so rarely becomes deranged that investigators have given it less study than other glands have received.

THYMUS

The thymus gland is located in the upper part of the chest above the heart. It is a soft gray-white mass with two lobes. It consists largely of a cluster of lymphoid cells which has led to the belief that its chief function is to produce lymphocites—white blood corpuscles. When it is largest, it weighs about an ounce, but after puberty it decreases somewhat in size. Of the functions of the thymus practically nothing is known. Many competent authorities believe it is not a gland at all. It has puzzled investigators, however, for more than a century because of the association of sudden death in children with enlargement of the gland—thymus death. The case for the thymus is so devoid of evidential weight that, for present purposes, it may be ignored.

ENDOCRINE PHYSIOLOGY

ADRENALS

The adrenal glands are located one on top of each kidney. From this location comes the alternative name "suprarenals." They are small organs whose combined weight is little more than a quarter ounce, but they play a highly important part in regulating the bodily economy and in preserving the integrity of the endocrine system. The hormones which they produce are exceedingly powerful drugs; indeed, adrenalin, the extract of the medulla, is so potent that the bloodstream carries it in dilution at the rate of one drop to a tank of water forty feet square and forty-five feet deep, but it is indispensable.

Each adrenal gland consists of two parts, the cortex (bark) and the medulla (core or marrow) which the cortex completely surrounds. These two parts, so closely connected, differ in color, in texture and composition and in function. The adrenal is closely related to the autonomic nervous system

which is affected by its secretions and by which it is stimulated.

From the gland have been made two extracts, adrenalin or adrenin from the medulla, and cortin from the cortex. The former has been in general use for twenty-five years and is important in various ways. Cortin is produced in limited quantity and is expensive. It is the only known remedy for Addison's disease which once led to certain death.

The hormones of the gland are discharged into the bloodstream. The hormone of the medulla, adrenalin, is accepted as the emergency stimulant which prepares the physical organism for sudden strains or violent exertions. Cortin is credited with a share in preserving metabolic equilibrium and has special relation to carbohydrate metabolism.

Adrenal hormones influence also growth and development, the growth and color of hair, the complexion, and have a distinct place in influencing other endocrine glands, including the gonads.

In seeking to allocate and differentiate endocrine functions, the great difficulty arises from the complexity of results in the regulatory influences. These influences are both stimulating and restraining or even inhibiting. In some instances—adolescent changes, for example—there is a withdrawal of restraining influences, and glandular activity which has been held in check is released until certain results have been achieved, when the activity is modified. In other instances—pregnancy, for example—inhibitory glandular activities are counteracted by excessive stimulation of other glands and in one case a new hormone-producing organism—the placenta—is created for temporary use.

Nature's purpose is, of course, to provide a constant balance, to give an excessive supply of hormones when they are needed and to cut down an interfering supply when necessary.

The adrenals, despite the great progress of the last decade, are still puzzling. Theory and speculation are more common than proof, but it seems

that in such variations of demand, they exert a particular influence in keeping the glandular system at work harmoniously to provide glandular and bodily equilibrium.

Derangements as the result of disease of the adrenals affect directly or sympathetically all other important glands, but are always marked by mental distress or deterioration and so influence the temperament or behavior.

Pancreas

The use of insulin in cases of diabetes is so general and so well known that we forget that its discovery by Banting was announced in 1922. It came as the result of years of experiments which followed the initial discovery of the relation of the pancreas to that disease. The pancreas had long been known as a digestive gland, but it was not known that the small clumps of epithelial cells, known as the *islands of Langerhans,* supplied a hormone whose deficiency caused diabetes.

The hormone is of interest in this work because it is the most perfect illustration of the possibility of the artificial supplying of a hormone. The secretions of the endocrines certainly move in mysterious ways and their failure leads to mysterious results. Diabetes is the inability of the patient to burn sugar, an abnormality of metabolism which manifests itself in a variety of ways. These include excessive urine output and consequent excessive thirst, increased appetite, loss of weight, dryness of the mouth and general weakness. Pains are felt in various parts of the body, sexual deterioration often follows in both men and women. Boils occur in large numbers and often there is a general and persistent pruritus (itching).

The variety of manifestations is surely great enough to indicate that the glandular system is out of tune, a conclusion that seems justified by the effects that other glandular disturbances and derangements have in intensifying the insulin deficiency which is the immediate cause of diabetes.

GONADS

The sexual glands are the gonads, the ovaries in the female and the testes in the male. The ovaries are located in the pelvis and the testes, in the scrotal sac, are the only ones of all the endocrines that are visible and, therefore, the only ones of which it may be said with certainty that they are present and of normal size. As with some other glands, the gonads are paired organs.

The *testis* is made up largely of minute tubules in which the sex cells are formed. The spaces around the tubules are filled with glandular tissue called the interstitial cells. It is believed that in these cells is generated the hormone or hormones that play an important part in both the bodily and the psychic development and growth of the individual. It influences the changes which come with puberty in which other glands share, but whether these other glands work independently to bring about these changes or affect the gonads so that

they act, is conjectural. Gonad deficiency will arrest or prevent the pubertal changes—the lowering of the voice, the development of beard growth, etc.—but pituitary, thyroid or adrenal derangement will often show the same results. It is probably true that the gonad hormone is supplied during the period before puberty in both sexes, thus beginning with life itself the characteristic differentiations in sex which later become more pronounced.

There is a clinical condition which occasionally occurs in males in which the testes—which originate in the body cavity of the embryo—fail to make their way to their final location. It is known as cryptorchidism and it is to be noted because of its significance in the interpretation of cases which will be subsequently discussed. The sex cells of these cryptorchid subjects do not develop and the individuals remain sterile. This sterility led to the discovery that the sex cells are particularly susceptible to heat. The sex cells in the body are at a

temperature from eight to twelve degrees warmer than in the scrotal sac, which is itself a kind of thermostat that regulates its own temperature. When the glands are imprisoned in the body cavity, even the slight increase in temperature is sufficient to sterilize the sex cells. It will appear later that the heat of fever, if of long duration, will impair or destroy the fertility of the male gonads. From this it appears that the infectious diseases of childhood, if suffered over an unusual period or in succession, will often render the sex glands impotent and, in consequence, leave a wreckage that is psychical as well as physical.

Gonad deficiency, either intentional or accidental, brings about changes that are of fundamental importance in their relation to the temperament and behavior of men individually and even collectively. It explains aberrations of conduct, personal peculiarities and eccentricities and physical abnormalities such as certain forms of obesity, unusual height and structure and also

the degree of alertness, intensity of application, etc.

The sex glands in the female, the *ovaries,* have some points in common with the male gonads, but in their entirety they are much more complicated, produce more hormones and perform functions far more complex and elaborate. They are liable to disease, they exert even more marked and varied influences upon individual development and on the psychical and social status. Evidence of the influence on temperament and conduct is found in changes during the lunar cycle and during pregnancy. And, because of these things, the female gonads go far in determining normality of emotions and explaining directly and satisfactorily abnormalities or providing a zone within which causes and results otherwise inexplicable will readily fall.

Of particular interest at this point is the part which nearly the entire endocrine system plays in the drama of childbirth, both before and after the

event. That drama is not the less interesting because common nor the less baffling or mysterious because it has received the meticulous study of men through all the centuries. It seems that men have contributed most to the study to this subject.

The recurrent process of preparing and providing the ovum for fertilization—menstruation—is without explanation of motive power save as endocrine secretions give it, but when fertilization has taken place, the endocrines are called on for heavy work. The anterior lobe of the pituitary gland is now credited with providing the influence which promotes ovarian development. Similarly, the gonad has an influence on the pituitary. The alternating stimulations from one to the other maintain the rhythm of the female sex cycle.

When fertilization has taken place, a new series of events follows. Various hormones begin to promote constructive work. The placenta is formed with the embryo and presently itself supplies a hormone. The various bodily changes that accom-

pany pregnancy are induced and regulated by an aggregation of secretions which include several peculiar to that condition and others in unusual quantity. The presence of hormones in the blood-stream may not usually be directly detected, but so abundant is the supply during pregnancy that two of them may be readily recognized. Theelin is also abundant in the urine and the supply of anterior pituitary sex hormone in the blood is demonstrable. The growth hormone of the pituitary is also increased. This augmentation sometimes affects the mothers, coarsening their features and giving them an appearance quite out of tune with their normal looks. The basal metabolic rate at this time reaches higher values. As might be expected the thyroid enlarges and becomes more active. At this time there are indications of actual hyperthyroidism. Thyroid deficiency is likely to cause defective babies.

Appreciation of what the entire glandular system achieves in its interdependent and coöperative

efforts, both before and after childbirth, opens the way for a clearer understanding of how defective interplay of the endocrines brings about the aberrations which have such a tremendous influence on human behavior as will appear later.

Strangely enough the gonads (sex glands), which are not essential to life, are the sources and causes of very many behavioristic difficulties. They seem to be affected by anything that affects any other gland; anything that affects them apparently affects every other gland. So conduct is influenced tremendously by the condition of the sex glands whose purpose in the scheme of things is not less the reproduction of the species than the fitting of the individual for that achievement and also for his position in the social order which is the final test of racial integrity and efficiency.

CHAPTER III

SEX AND PERSONALITY

THE COMMON attitude toward sex varies with the times and the fashions. It varies with races, with the degree of civilization and with the educational status. It is the basis of customs, frequently of religious rites and exerts a commanding influence in literature, art and the rules of conduct which we call law. It veils the faces of women in Mohammedan countries, isolates them in India, classifies them for duties and occupations and is the controlling influence in the adjustments of society. Commerce and industry are by no means beyond its influence; indeed, it is a pertinent truism that sex rules marriage which is the basis of the family around which the entire social structure is built. We may say, then, that sex rules the

world, or we may say "'tis love that makes the world go 'round," which is the same thing. Thus there is always an attitude toward sex.

Unfortunately, for freedom of expression, the word "sex" retains a connotation which is likely to be interpreted as its principal or only meaning. Such an interpretation is by no means confined to literal or vulgar minds. In this aspect of it sex is a fact of current banality, the spring from which there is a constant flow of more or less polite euphemisms, although, in current literary and dramatic output, euphemisms are rather subordinated to bold and direct expression. This directness comes from unexpected sources and is found in surprising places. Authors and publishers are not at all apologetic. If they take the trouble to mention it at all, it is merely to say casually that the public demands it and that the demand is for unmodified and direct language, strong and striking illustrations and vivid emotional pictures. An indolent public resents necessary recourse to the

imagination. Possibly from the same vague source comes the analogous confusion which has placed profanity and obscenity in the same literary category.

With all that, however, we are concerned only as it bears on the commonly accepted meaning of the word "sex" as it has evolved out of the prudery and taboos of the last century.

A bold definition of the word is that it is the total of all the peculiarities both structural and functional which distinguish the male from the female.

Under such definition reproduction, while obviously the one great aim of nature, becomes only a single item in a mass which includes with structural and functional differences, psychological variations and such a weird and exciting array of behavioristic and emotional aberrations, that the finding and establishment of a norm of conduct is all but impossible. For an approximation of normal we must establish a perfect balance in the

functioning of the endocrine glands. The sex glands are integral parts of the endocrine mechanism that has to do with individual growth and development and the maintenance and continuation of life to the apparent end that the human race may thrive and endure.

Marriage is merely a social method of indulging or frustrating a normally instinctive or glandular urge, but the two are otherwise unrelated. Love, which may or may not transcend the sex impulse, is, then, its own justification. It probably has much to do with making the world go 'round and will doubtless continue as the motive power.

The sex glands, important to society and its organization, are no less important to the individual and the part he is fitted to play and does play in the organization. Deprived of this physical equipment, he is not only physically sterile, but he or she is also emotionally distorted, that is, incapable of functioning normally in the

social environment in which he happens to be placed.

As previously stated, the variations from sex normality may be of many kinds and degrees. Physical and consequent emotional departures from the theoretical norm will cover a wide range, but in glandular relationships, that is, balance among glandular influences, no rules of correspondence or correlation have been discovered. It is known only that there are relationships, that the endocrine glands are bound together in a system. Each gland and each hormone has its own function, but none is apparently capable of operating efficiently by itself.

Important as the gonads are, they are not vital organs. Their removal causes emotional rather than physical distress and it would be beyond the evidence to say that their absence shortens life. There is, however, no doubt of their influence in

the formation of character or the structure on which character is built and depends. There is no doubt that alone, or in conjunction with other glands, they exert a startling influence on growth and development, on personality, on behavior, on the entire conglomeration of habits, instincts, decisions, choices, errors, desires, ambitions, thoughts and actions which make up the sum of human existence. In terms of human relationships and in social significance, sex, in its broader definition, transcends all else. It is the urge and instinct which drives and restrains. It makes life various, interesting, sweet, bitter, uncertain and worth while. It is the source of contrasts and conflicts. It tells us that, without evil, good would be meaningless; without pain, pleasure would not be susceptible of appreciation. We are born. We live. We love. We die. We are not consulted about the first or the last. We live, perhaps, because the alternative is thought to be disagreeable, but we reproduce because we must or remain incomplete.

The instinctive desire for completeness drives us on. If we deny it, refuse to yield to it, are indifferent about it or incapable of it, science is justified in seeking and searching out causes, in investigating prenatal conditions, heredity, environment, physical and mental aberrations and the more intricate problems which enter into the scheme to make up the grand total which we term human behavior. Life, it is said often enough, has become complex, but life has not changed since records were kept. We have, however, arrived at a small comprehension of the causes which regulate life—the endocrine glands.

Reproduction, as already stated, is only one of the functions of the gonads. Through the action of their various hormones, they influence growth and development, thus preparing the body for the ultimate achievement, but the preparatory proceedings are so varied that they often seem remote.

Doubt that the sex hormones become active, even in the prenatal state, is slowly being dissipated. They control development in both sexes before puberty.

Before the age of adolescence, when sex differentiation becomes pronounced, boys and girls show slight bodily differences. But even in babyhood dispositional distinctions are apparent, more so in some cases than in others. Environment, association and the elements that enter into what is termed social conditioning have effects against which the natural forces struggle. A boy brought up in a feminine atmosphere cannot escape some of the influences of it. A girl placed in a large family of boys will play their games and get from them her dispositional cues. The intensity of the sex pronouncements will also vary. Tomboys are not always explained by the nature of the environment and "sissy" boys may be such as the result of the distribution of sex cells, because to both sexes there is a common distribution of maleness and

femaleness with one dominant and determining. Sex differentiation, however, manifests itself frequently in babyhood. A discriminating eye may tell a boy from a girl at a glance, but not always.

But when puberty comes, the marks of distinction become pronounced and dispositional traits declare themselves. The secondary sex characteristics appear. These variations extend beyond physical conformations. The growth that comes with adolescence is markedly increased in both sexes. In the male the larynx enlarges, the voice deepens and hair appears on face and torso. In the female the breasts develop, the pelvis changes, the figure rounds out and the hips are enlarged by fatty deposits. In both sexes comes growth of pubic and axillary hair. The head hair of the female grows more rapidly. Both become sex conscious and in the female the maternal instinct is awakened, a development that may likely have been prepared for by the playthings that have been given her. It

should also be noted that the female has fewer red cells per cubic millimeter of blood.

While these changes and developments are controlled largely by the internal secretions of the gonads, other glands are involved. It is accepted that the anterior lobe of the pituitary is closely related to the gonads, but the pituitary is intimately concerned with bodily growth. The pituitary hormones must work in conjunction with those of the gonads. But derangements of thyroid and adrenals will interfere with sex development and so with physical growth. Thymus, pineal and parathyroids function, if ever, at this time. The case for the pineal and thymus rests very much on their influence before and during adolescence; the parathyroids, it is rather generally agreed, regulate calcium metabolism, and bone formation at this critical age is dependent somewhat upon them. Thus the glandular system is charged as definitely with responsibility for pubertal changes as for fetal growth and adjustment. All the hormones, un-

doubtedly including those of which we have little or no knowledge, come into play conspicuously. In addition to promoting growth and change, they influence one another. Thus we find a sound basis for the conclusion that normal functioning of the glands and harmony in their adjustments to one another are indispensable to normal and harmonious development of boy and girl.

It is a fair assumption that, in the stress of this unusual activity, some glands produce more or less than the exact amount of hormone needed or desirable for a perfectly rounded development. This, as has been shown, is the case during the period of gestation and the excess is disposed of through natural channels. During adolescence, if there is any excess of hormone, its effect may be inhibited or decreased by others. It is deducible, however, from end results, that there is a variation as among individuals in the dominance of one

hormone over another or over all others or of one group of glands over another. Otherwise, we could not account for differences in human beings. These differences are finely divided, including variations in height, girth, weight, length of arms and legs, facial size and contour—in fact, the entire array of physical peculiarities, colors, shapes, sizes and what not. These differences in bodily conformations may cause or merely parallel differences in temperamental or dispositional traits. They may influence character development or underlie the whole character structure. Thus the variations in glandular activity or quality of glandular hormones are not only the causal force in bodily size and configuration, but are equally the causal force in producing variations in temper, in temperament, ability and character. All of these differentiations and variations noted, however extensive they may be, come still within the range of what we have termed normality. The variations within this restricted range are obviously great enough to

explain the all but infinite variations in behavior, in dispositional traits and in temperament and character. A step beyond normality we find a new infinity of changes, and two or three steps beyond still more. But there is no line of division and there can be none. Racial and other distinctions intervene. Certainly conduct that is normal to a Latin may be far from it in an Anglo-Saxon, with Chinese and Maoris still farther beyond or within the pale. It is unnecessary, however, to go so far afield for illustrations.

Glands do not always function harmoniously. They are influenced and they exert influence. The sum of these influences and the results of them are translated into the physical structure in varying ways and then into instinctive conduct as well as into rational conduct. Instinctive conduct and rational conduct are often in harmony. They agree in telling one to eat when he is hungry and to

drink when he is thirsty. They disagree to some extent at times, because instinctive hunger or thirst will overturn the rational impulse not to steal. The rational impulse to stay awake for the sake of a specific accomplishment will in the end surrender to the instinctive impulse to sleep. Thus it appears that instinctive impulses are subject to inhibitions by the centers of intelligence and that there is and must be a more or less constant variance between the two. If the instinctive urge is strong and the inhibition weak, instinct may be said to triumph over intelligence. The command of the flesh is stronger than the resistance of the spirit. There may even be found in this a basis for agreement with St. Paul that the flesh lusteth against the spirit and the spirit against the flesh. At any rate, there is a battle in constant progress and the outcome is seldom a draw.

The varying results of these conflicts are most likely to be translated into uncertainties in behavior. The weaker the inhibitions, the stronger

the instinctive reactions. The reciprocal is also true. The behavior may become what is called circumspect or over-intelligent if the instinctive or glandular urge is weak or absent. Lack of balance as measured by sex conduct, for instance, is productive of evil acts in the field of morals, but merely of acts in the field of instinct. The point of present interest is that dominance in either department upsets the balance and conduct becomes to some degree abnormal as the result. The abnormality may be temporary or permanent or recurrent, but it will not be the conduct of a normally balanced person, although it may at times have that appearance.

All glands are subject to disease, and the gonads for various reasons may be removed in part or completely extirpated. A diseased condition of any gland may have a serious effect on the gonads. Thyroid, pituitary or adrenal derangement is re-

flected in gonad disturbance, often serious. The effects of surgical removal of the gonads varies with the age at which the operation is performed and the effects of disease vary with the age and, of course, with the extent of the resultant impairment of organism and function.

The results of surgical removal—which is common in both sexes—have been well understood for many years. It is a common procedure with farm animals, resorted to for the purpose of increasing their size and improving the quality of the flesh. It also makes them more tractable which, in some instances, is desirable.

In men and women the physical changes are pronounced and show in the growth of the hair, quality of voice, in texture of the skin, in physical activity, in blood pressure, and it usually brings about a condition of obesity with the fatty accumulations largely confined to the abdomen. In women it brings on artificial menopause (change of life).

The psychological effects are varied, but no less marked. If the defect arises before puberty, the secondary sex characteristics fail to appear and the temperamental changes are also absent or perverted. It has been noted that the victims may suffer no impairment of intelligence, although they are likely to be moody, silent and introspectional. Many of them become studious and win recognition for ability. Others are mentally weak and unstable, approaching the psychosis known as dementia praecox (adolescent insanity). It is also apparently true that the gonads of those afflicted with this mental abnormality are never normal.

Accepting the psychological derangements as proved by the vast mass of available testimony, we pass to the problem of the psychical condition of those who have suffered impairment of gonad efficiency through accident or disease. Thyroid, pituitary or adrenal inefficiency, which reacts to

affect the gonads, is not difficult to detect in extreme cases. There are always pronounced physical and visible changes. But in the cases where the changes are not pronounced, the psychical consequences may not appear to be related to gonad insufficiency at all. This is all but universally true in cases of devastating diseases in childhood, before the age of adolescence. The damage may not be discovered for several years. It may manifest itself only in behavior which is subject to so many conditioning influences that striking evidence is needed to bring the attention back to endocrines and early misfortunes. Indeed, emotional aberrations usually pass without other than emotional explanations. Behavior does not of itself suggest physical causation. Eccentricity usually calls for apology rather than diagnosis. A flat-chested, narrow-hipped, angular, mannish woman, even less than a womanish man, makes no suggestion of glandular derangement. If sex impulses are wholly or partly absent, they are not missed by the

one afflicted, and another is interested only if this absence interferes with him or her and then only to the extent of ridding himself or herself of the interference.

It is admittedly difficult to mark the extent of gonad impairment when it is not complete and more difficult to rate the influence of it on conduct. The diagnosis does not proceed from the condition of the gonads to the mental or temperamental state, but from the latter to the former in the rare cases where it does not end with the neurosis or psychosis or whatever it may be. The range of manifestations is as wide as the range of glandular inefficiencies.

A common outcome is a derangement known as Fröhlich's syndrome (complexity of symptoms), in which the gonads are involved as well as others. The result, in terms of behavior, is described as infantilism. Infantilism may be physical, that is, there may be an interruption of growth and development which leaves the patient underdone bodily

and mentally. The deception is not so pronounced as to cause more than curiosity. But when the individual reaches physical maturity and retains an immature emotional development or an emotional condition that is childish in some aspects and not in others, individual and social difficulties and problems are encountered. Childish adults, adults with childish emotions, grown-ups with distorted sensibilities, are by no means uncommon and they are always disturbing. It is puzzling when one sees a full-grown man exhibiting childish delight and parading himself and his talents and gaining childish pleasure in approval and applause. Men and women of such emotional equipment are likely to be found in places where display is rewarded—in the pulpit and on the platform, in the forums of politics, in society where the glare of publicity is brightest, in "movements" where public morals are the fruits to be preserved—in such places the lop-sided, emotionally distorted infantilist will be found indulging in exhibitionism, bid-

ding ardently and arduously for attention and favor.

Inharmonious emotional development indicates defective hormone influence. Reactions are consequently not normal. Every man and every woman judges the conduct of other men and women by standards based upon his or her own observations and experiences. Emotionally unbalanced persons have defective standards. They look at the world and its people from a wrong angle. They fail to measure accurately or to appreciate the motives of others. Reciprocally, not being normal themselves, they are more than likely to be misjudged. They are not unusually treated with intolerance and roundly abused. There are indications that on many occasions their critics are officiously intolerant, for the same or similar reasons that their butts are obnoxious. We find the extreme wets picturing the extreme drys in a symbolic figure that to a trained eye would suggest gonad deficiency. The extreme drys might, with as good grace and as

much truth, characterize their opponents with a picture as truthful and suggestive of the same defect. But the symbolic picture of the wets would be fat with eunuchoid trimmings at the waist line to explain his intolerance, as the other picture is lean and has eager eyes to show that nothing can dim his singleness of vision. Intolerance is always a cause of suspicion. A normal emotional equipment brings objective as well as subjective reactions. A common infantile outlook is that the sun rises each day only to shine on a particular infantilist.

Emotional abnormals are sometimes indifferent, but the infantilist classification is intolerant of conduct it does not understand and tyrannical in its judgment of it. The infantilists may themselves become a social problem by directing their attention to social problems.

Fortunately, however, they are likely to revolve in a very small emotional universe and a still smaller world of action. Devoid of the impulses

which drive normal persons, they find other outlets. They are often studious. They have powers of concentration. They frequently develop what talents they have to a high degree. They are often superlative musicians, orators, teachers. They have talents which are pronounced, and instabilities which are compensating but not balancing. In positions of authority they are tempestuous, dictatorial and unfeeling. They are martinets and strict disciplinarians, no more sparing of others than of themselves. They have no sympathetic understanding and they neither seek nor give sympathy. Their sense of justice is distorted and, like Simon Legree, they delight in cruelty and look unfeelingly upon the suffering of others. In short, they have certain sterile emotional areas of which they are usually quite unaware.

Of course, there is always another side and, in this emotional classification, there is another extreme. Our infantilist may be, and not infrequently is, socially shy, uninterested, detached,

quite content to lead a mousy existence and gain what meager sustenance he needs from religion, reading or music. But the mousiest may still have a lingering fondness for self-display and applause.

Again we must remember that the degree of the imbalance is important and the scale is a long one with finely marked gradations. We must also remember that we can attain a point of fair judgment only by study and observation of extreme cases. Only in these will we find types of behavior and the explanations from which we may draw conclusions as to intermediate cases whose diagnostic range will stretch, say, from pronounced infantilism to a "bit eccentric" or very talented. Relating the behavior to its cause, in all cases of glandular derangement, or dysfunction, is a work for experts, especially in the less pronounced cases. It is obviously much more difficult where the departure from normal is slight and the aberrations are only occasionally pronounced. In so compli-

cated a mechanism as the endocrine system, the causes of disturbance are many. Inferences and snap judgments must be avoided. It must not be concluded that a corpulent gentleman is so because of deficiency of gonad secretions or that an irritable lady is under the influence of the lunar cycle. Infantilism manifests itself variously and its various manifestations may possibly have other causes. Politicians may reverberate and orators strut because of the impact of other forces than gland secretions or the absence of the incentive which secretory failure brings, but glandular disturbances are often enough at fault. Even normal glands may be badly trained. Examples are important.

William V. T. was a victim of infantilism. His was a glandular syndrome, with pronounced gonad deficiency and probably thyroid and pituitary complications. His history is characteristic of

infantilist behavior and the recital will indicate the obstacles encountered by those who undertake to secure complete records of such cases.

William V. T. was a big man in a small way and he ran a course which was normal to his emotional equipment and perhaps his end was normally tragic. He passed his early childhood on the Indiana farm where he was born. His father was a prosperous farmer, a deeply religious man as his neighbors viewed him, and with old-fashioned notions about rearing children. His mother shared these notions and William early learned all there was to know about the traditional relationship between the spared rod and the spoiled child.

William was an average boy. He was not noticeably bright in school and he had a wholesome resentment for the monotonous chores of the farm. Possibly his father had little liking for them. At any rate, when William was twelve years old his father sold the farm advantageously and removed to a nearby town where he set up in

business as a real estate and land agent. He was an austere man and an eminently respectable citizen. These admirable qualities became qualifications and, in due course, the one-time farmer was honored by election as justice of the peace.

The father's election to office was coincident with William's severe illness. He recovered from an attack of diphtheria only to be afflicted with mumps, accompanied by orchitis. His convalescence was slow. He had a rather long period of idleness which he employed, as soon as he was able, in reading.

His father's attainment of political distinction excited William greatly. It was his first taste of public favor and he liked it as much as if the triumph were not vicarious. The influence found effect in his reading. Political science, economics and famous speeches by famous orators, brought to him from the village library, engrossed his attention without, however, displacing the Bible.

When his recovery was complete, William was

a changed boy. He returned to school to surprise his teachers. This average lad had become extremely studious. He continued his home reading. He sought and found guidance. He passed easily to the head of his class, to the position of first student in the school. His teachers marveled. They were also pleased and proud.

Within a year William had also developed an inordinate ambition for the center of the stage and all of the limelight. He grew rapidly and took on weight. He carried his growing corpulency well and thought it imposing. He never played for play's sake and he played only "to the gallery." He arranged debates and oratorical contests, exhibitions in which he excelled, and when he had exhausted local student talent, he went afield for new opponents. He found and vanquished them. He pictured himself, as he later confessed, as a leader and orator. He had many admirers. They admired his persistence as well as his ability. It never occurred to them, or to him, that he was emo-

tionally unbalanced—that no sex urge would ever send him wool-gathering or distract his attention from his studies, his ambitions or his determination to shine on in the world made for him to shine on. His emotional impulses were all toward a single form of expression.

Like his father, William was deeply religious and had profound and unalterable convictions. Sin was plentiful and no subject for redefining or for compromise. He gloried in long, loud and fervent prayers and believed them effective. When he began to realize that he could sway an audience with his oratory, he was overjoyed.

This capacity to preach and pray, on the one hand, and to speak effectively, on the other, brought to William a pretty problem when he finished his high school course. What was it to be—the pulpit or the bar? The church and the law had each its attractions. They offered about equal opportunities for the display of his wares, but the rewards of the law seemed more promis-

ing. William hesitated. He argued it with himself, but his father made the decision. In the fall William entered law school.

He devoted himself wholeheartedly to his work. New associations and surroundings offered new diversions, but William was not diverted. There were temptations, but he was not tempted. William had heard of St. Anthony, but did not understand the victory. Card playing was abhorrent *per se* and gambling was only a variation of it. Drinking was an invention of Satan—in fact, the run of social diversions was stupid and boring unless there was an underlying church purpose. He ventured away from his books only if there was possible a chance to exploit his power to speak. On occasions he preached for the love of it and to keep his voice in condition.

With his fellow students William never became popular. They either did not understand him or they did. His emotional reactions were not theirs. But they admired him as a performer and joined

the professors in predicting for him a brilliant career. They did not take the trouble to wish him success. He was not one of them.

In due course he entered a law office. The head of the law firm had at one time been governor of the state. He was anxious to gain the position again and contemplated a campaign for reëlection. The young lawyer, with a growing reputation as a spellbinder, fitted well into this political planning. It was a great opportunity for William and he appreciated it. His capacity to veneer words with sincerity needed only the finish which practice could give. His tutor was a practical and experienced politician. Here was the combination of ambitious leader and pliable, willing pupil. The earnest and energetic youngster contributed in no small degree to the success of the campaign. The ex-governor was elected and the future looked rosy for William.

But Fate, in the guise of William's topsy-turvy emotional system, willed otherwise. The governor

did his part. He wished to tie this useful young orator to his bandwagon. He urged his protégé to run for office—to get himself into the line of political promotion that extended endlessly into the future. William was willing. He sought, with his friend's assistance, the nomination for a rather important state office.

Now a startling thing happened. The young man, so self-assured during the campaign of the governor, was a dismal failure in the struggle for his own election. He was assailed by doubts as to his fitness for public office. He spent long hours in the night praying for guidance when he should have been seeking the recuperation of sleep for the strenuous work ahead. He became timid and uncertain. He lost his punch. Before the campaign was over his audiences dwindled away and at the election he was badly beaten.

Overwhelmed, unnerved and in the throes of hysteria, he took to his bed. He insisted on having what he called a nervous breakdown. Dr. Mayers,

one of the authors of this book, was called in. The young politician refused to be calmed. As it had long been the physician's conviction that all public officers should be healthy, normal persons, he assumed the responsibility of informing the sufferer, rather brutally, perhaps, that his choice of a political career was unwise. He explained that frequently the storm and stress of politics would cause a violent upheaval in emotionally unstable people; in this case the cause was infantilism and, after all, abnormals had no place as representatives of supposedly normal people.

William was impressed and a little awed at such a rude awakening from his ambitious dreams. He was loath to admit that he was abnormal, but he had, of course, long known of his defect. Some feeble attempts at love-making had brought quick disillusionment. His stern religion had taught him to glory in abstinence. It had not been difficult for him to renounce the things of the flesh. Sex impotency and fleshly renunciation were admirable

companions and he clung to both with spiritual satisfaction.

However, his decision to abandon politics and a political career came finally and reluctantly. The governor endeavored to hold him as an active part of the political machine, but William was obdurate. In the end, the governor made him the head of a reformatory school for boys.

In his new position William soon proved to be a strict disciplinarian. Severe punishment followed the slightest infraction of rules. He delighted in pointing to himself as a shining example of what judiciously administered birching could produce. The boys of the school hated and feared him. They had an instinctive feeling that they could not hope for sympathy from him. He treated them not as erring human beings but as lost souls. To him every boy was possessed of a devil and it was his bounden duty to exorcise that devil and cast him out. As there were many boys, there were

many devils and there was necessarily considerable casting out on the program.

Visiting committees were loud in their praise of the morale of the institution. They were impressed with the spotless appearance of everything, including the inmates. They were strongly in favor of what seemed to them genuine discipline. They might possibly have been shocked if they had known of the seething unrest and the grim resentment among the boys, a majority of whom were defectives. They were not defective in the usual acceptance of the word; they were not half-wits or insane; they were defective emotionally, like the head of their reformatory.

A rather insignificant incident brought this unhealthy condition to a climax. As they had often done before, the boys held a forbidden boxing bout. One of the participants received a rather severe trouncing, with a swollen lip and a blackened eye as the evidence. A rigid investigation

followed. William, secure in his exalted position, called the boys together and lectured them in his most impressive style. Then he added insult to injury by sending the boy with the black eye to the solitary cell. The boys thought the punishment unfair. It outraged their ideas of sportsmanship. With one accord they set up a howl. They greeted William with groans of disapproval. William lost his head. The boys were quick to sense the fact that he was afraid. They rushed him and pummeled him rather severely before help came.

William's emotional system was incapable of withstanding such a shock. The memory of his narrow escape haunted him for months. However, no hint of the occurrence leaked out. Scandal was avoided. But thereafter he was never without a bodyguard.

But the end had not come. William's idea of the wholesomeness of punishment had not been changed. It never occurred to him that his way was not the right way or the best way. To the

ordinary punishment he added a series of petty persecutions. The boys were embittered and finally came a mutiny which could not be suppressed.

An investigation was ordered and William V. T. resigned. His shattered glandular system, his lack of emotional balance made him completely unfit for work which was well within the scope of his mental capacity.

Soon after his resignation he retired to his brother's farm where influenza brought his abnormal existence to a merciful close.

It is fortunate that, while William V. T. was a man of action and played a part in the theater of life, his conduct resulted in no great damage to others. The disturbances that he caused were of little consequence. They might have been vicious, however. Placed in different surroundings, his instability, despite his religious addiction, might as easily have led to criminal behavior. In another age he might have burned witches for their own

good or led a crusade against heretics. It is a justified conclusion that chance placed him well.

It is surprising how frequently chance or a process of selection places the emotionally unstable in positions to which they are adapted. Sometimes, with incentive to action dulled and ambition gone, they become harmlessly passive characters who attract no attention so long as they are cared for by parents or relatives, or are content to earn their livelihood in positions of no responsibility. In this respect Clara B. was typical.

She was the healthy, normal child of average normal parents. During her early school years she attracted little notice. Like other school children she found delight in play and outdoor games. She was no better than her playmates in her studies and her appetite was just as good. She passed through the slight ailments of childhood, probably worried over teething and paid the usual

penalty in the form of indigestion. But, shortly before adolescence, she was the victim of three infectious attacks in rapid succession—diphtheria, chicken-pox and mumps. As often stated, these infectious diseases with their high temperatures are very likely to affect such delicate organs as the glands. A succession of attacks naturally increases the chance of permanent harm. Clara's final convalescence was slow; she was anemic and there was a noticeable but unnoticed change in her habits. She had lost her eagerness for outdoor games and play. She showed decided preference for the company of her mother and avoided her old playmates. She ceased to be an average student and became a model pupil. She was quiet, timid, faint-hearted, but diligent in her lessons and forever poring over her books. She never caused her parents the least anxiety. They knew she was never far away. Her teachers, instead of wondering, were delighted. They had nothing but praise for her conduct, her attentiveness, her diligence.

The cultivation of such attributes is plainly the triumph of teaching. They had developed one youngster to whom mischief was unknown.

Clara's fellow pupils were not impressed, however. They had their own ideas of snobbery and doubtless had another word for aloofness. They disliked her heartily or were indifferent. Clara's mother had an easy explanation. The children were jealous of Clara's goodness. The mother called it "Clara's devotion." She was an old-fashioned mother who came along near the end of a generation of prudery. To her sex was unmentionable and, if mentioned, it bespoke a foul mind. It meant nothing to her that her daughter's menses made a belated appearance at the age of sixteen or that they lasted only two or three days instead of the usual six or seven. That this condition might be a symptom of some radical maladjustment in her daughter's make-up never occurred to her. If it had she would doubtless have closed her eyes to it.

Clara continued to be frail and retiring as she grew older. In high school she could not avoid all social activities, but she preferred to stay at home. She was pretty enough, but the attentive advances of the boys in her class left her cold. Dancing fatigued and bored her. She had only two interests—dramatics and religion, both of which were forms of expressing the emotions which she lacked. However, she became a devout church goer and she was delighted to take an active part in amateur theatricals. Clara's frail prettiness appealed strongly to the protective urge in men. She received attentions, which soon cooled or were chilled, and more than one proposal of marriage during the years which followed. But her emotions were dormant. For a long time she played with the idea of becoming a professional actress, but she was too weak-willed to fight the opposition of her mother. Slowly but surely her form took on angular lines; her slender, breastless figure became faintly masculine. From time to time she became

subject to periods of marked depression. Eventually she ceased to wonder about her dissimilarity to other girls. She accepted her dull, uneventful spinster life as normal.

Sex emotions or the urge of the maternal instinct never disturbed Clara. The successive infections during childhood prevented one or more of the important glands from developing. She had been robbed of her birthright. The desire to reproduce was denied her. Marriage, if for any reason she had accepted a proposal, would have meant unhappiness for her husband as well as herself, because happy marriage without normal sex life is impossible. Under the circumstances she chose, after all, the right road, but the tragedy is not less because she happened to be the single victim and, perhaps, an unwitting one.

CHAPTER IV

CYCLES OF LIFE AND CHILDHOOD DISEASES

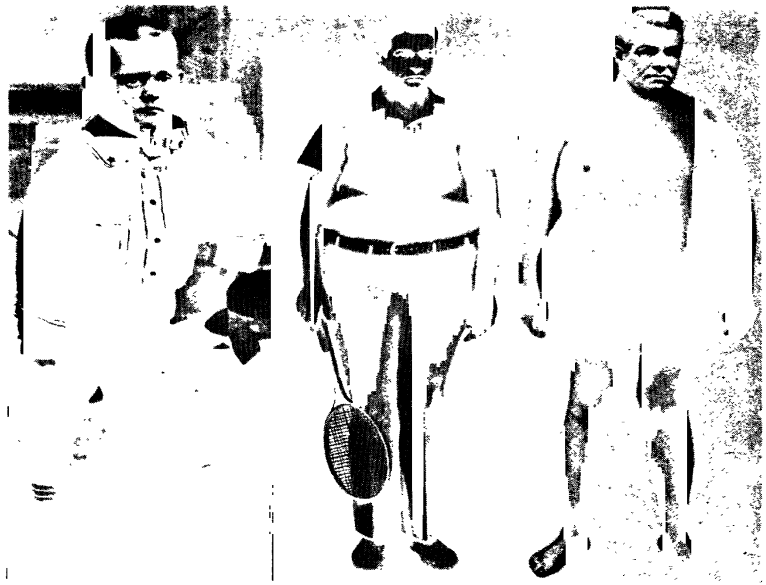
LIFE RUNS in cycles. It may be divided into the seven ages of Shakespeare or as fancy or convenience may dictate. But, physically speaking, the cycles are infancy, adolescence, maturity and age. That is the order in all life—growing, budding, blooming and decaying. The process goes on regardless of other phenomena and, if not interrupted by disease or violence, runs the course to a natural end. Such influences as spring from health protection, social organization or family clannishness are extraneous to the processes which create the cycles.

It is only with the human animal that the rearing and education of the young become complicated and of long duration. The responsibility of

the parent seems not wholly to cease until death. It is not so with other animals. Fish spawn their eggs and go on their forgetful way. Birds hatch their broods and feed them until fledged. Beasts suckle their young and teach them, by example at least, to hunt their food. But parental responsibility ceases in all cases when the young are able to shift for themselves.

However, animals are in general gregarious. They gather themselves into flocks, herds, droves, gangs, coveys, schools and what not, just as men congregate into families, clans, tribes, nations and races. With men the family is the basic unit of social organization. There would be no social development worth mentioning if, after mating, the man and woman went their separate ways.

It is through his offspring that man becomes immortal and family and racial permanency are assured. He lives on in his children. This is an instinctive ambition, stronger and more relentless in the woman than in the man. But it is society



WILLIAM V. T.

An infantilist. He was lawyer, orator, politician—studious, religious and lopsided, and ruined by lack of emotional balance. A type as well as an individual in physical and mental form.

[See page 109]



CLARA B.

The joy of her mother because she stayed at home—the pride of her teachers because she always knew her lessons—but a hypogonad, condemned to the solitary cell of a mousy spinsterhood.

that gives the parent pride in achieving this ambition and pride in having his children carry it on. Normal men and women wish their children to be healthy, industrious, wise and respected members of the social organization. The parents endeavor, therefore, to guide them safely through the turbulent years of childhood and adolescence into maturity. The guiding is not without its troubles.

Paradoxically enough, the normal child is far from easy to guide and hold in the path that leads to success in our highly specialized, complicated and remorselessly exacting civilization. The tendencies incidental to cyclical changes will assert themselves to turn aside the most carefully made plans. Parents find their wishes frustrated, and their hopes defeated by headstrong children whose bents are, after all, quite natural although it does not seem so to the parents.

The normal, healthy child comes into the world without handicaps. It feeds, sleeps and grows. The healthy cells in the little body multiply rap-

idly. There is presumed to be a close relation between the child's nutrition and growth and the thymus gland. There are authorities who doubt this relationship. One of them says:

> "In spite of the fact that certain authors ascribe an important function to the thymus gland in disorders of the endocrine system, the function of the thymus gland is as yet unknown. . . . It is not even known whether the thymus gland furnishes a hormone. Perhaps the gland responds to hormonic and general metabolic action without furnishing an internal secretion of its own."

The basis for the belief that the thymus gland is important to childhood seems to rest entirely on the fact that its weight increases after birth, the growth ceasing only with the beginning of sexual maturity. After that change, the thymus tissue gradually atrophies and is partly replaced by fat, although appreciable remnants of thymus tissue are retained until the end of life.

It is on such scanty knowledge that the conclusion of the gland's importance in childhood is based. But it is a fair statement that the thymus is accepted as a part of the glandular system and may, therefore, have function only in relation to other glands in the system.

The pineal is another gland of which very little is known but much is suspected.

The pineal gland is a tiny body, only a trifle larger than a grain of wheat. It is placed in a practically inaccessible part of the skull, beneath the brain. It may or may not produce an internal secretion. The conjecture is that it elaborates a secretion which regulates or delays the onset of puberty, that is, it acts on other glands to delay the appearance of adult characteristics until the age of adolescence. This conclusion arises from knowledge that sexual and mental precocity in children is accompanied by disease of the pineal,

tumor, for instance. This condition is also attributed to pressure on the brain. Opinion seems to incline to the belief that deficiency or perversion of the pineal secretion is the cause. In any event, this gland seems to serve whatever its purpose is in childhood. After puberty it, like the thymus, undergoes change. It atrophies and apparently becomes negligible.

To the gonads, the thymus and the pineal which are credited with playing some parts in the cycle of adolescence, must, of course, be added the pituitary gland, or hypophysis, and the thyroid. Thus there is not only a coöperative glandular play at this period, but a particular functioning to make it the stormiest of all the cycles of life—the great fundamental, physical transformation from boy to man and from girlhood to womanhood.

This transformation may be impeded or seriously interfered with if the glands are not normal

and healthy—if, indeed, the entire glandular system is not functioning harmoniously.

The glands, unfortunately, are constantly menaced by disease and accident. The visitation of either may not only mar the full enjoyment of subsequent years, but may also take the afflicted one out of the stream of life and set him apart as an emotionally abnormal or unusual specimen.

The consequences of imperfect or perverted functioning of the endocrine glands are not easily detectable. Unconventional behavior is as likely to become manifest in such a condition as illness. With the exocrine glands (glands that give off excretions), or some of them, there is less difficulty. The excretion of the kidneys, for instance, may be examined and analyzed. Any trouble or disturbance may be measured with speed and accuracy. Destruction of kidney tissue as the result of scarlet fever, for example, is always shown in the urine by the presence of blood, pus and casts, the casts being a part of the organized, delicate tissue

of the kidney. If infection produces such effects in an excretory gland, it is apparently a legitimate inference that in another gland it will set up a similarly destructive process. In an endocrine gland, however, the secretion will not be excreted, but will be poured into the bloodstream. There it cannot be analyzed; indeed the quantity is so minute that it cannot even be detected. The chemical action of endocrine secretions is at the best only partially understood. Over- or under-supply or perverted quality of the secretion can be inferred only from other disturbances if it can be inferred at all. These other disturbances may be obscured for several years.

The harmonious functioning of the endocrine system alone holds out the promise of a balanced emotional structure, of a fruitful maturity and a serene old age. Old age is not dreadful, although dread of it not infrequently borders on frenzy. A

life that has been filled with healthy emotions, given a healthy outlet, will complacently run its course. With the advent of the last cycle, menopause, or change of life, so-called, in women and degeneration of the interstitial glands in men, the normal human being will find peace and satisfaction in his memories and pride in his children and children's children. Slowly and surely the entire mechanism of the endocrine glands loses its efficiency and, at last, when disintegration is complete, the normal being passes peacefully on, accepting the inevitable with a smile and not afraid of the long slumber after a life worth while. With the glands goes the last incentive to live.

Puberty—the age of adolescence—brings with it, as we have seen, the most pronounced changes. These changes are physical and psychical. The growth is rapid. The change from child to adult is often startling in its speed. The skeletal or bone development is pronounced. The heart increases approximately one-third in size. Exocrine glands

enlarge, often bringing a trail of acne—pimples and blackheads. Perspiration becomes more profuse. In boys, the voice deepens as the result of growth of the larynx. All the secondary sex characteristics appear. With the physical changes comes a changed mental outlook. The character, with its inherited traits and those molded by the influences of childhood, hardens into form. It is seldom that any decided change in character occurs after maturity. And every child becomes an individual problem, and often a vexatious one. Any departure from regular development, any speeding or slowing up, any aberration in conduct—and there may be many—deserves serious consideration.

The common infectious diseases of childhood, at whatever age they appear, have a decidedly important bearing on the changes which adolescence brings. The danger in these common ailments is entirely out of proportion to the attention they receive. Measles, mumps, chicken-pox, whooping cough, scarlet fever, influenza, common colds,

bronchial pneumonia, bronchitis are ordinary visitations. Some of them are almost certain to be met. Home remedies and a little extra care are usually considered sufficient for the simpler ones and too often the physician takes the same view. A prescription is a precaution. The régime is rest and avoidance of exposure. The disease runs its course. Nature asserts itself. The child is soon running about again and these matter-of-course incidents are soon forgotten.

And yet surprisingly little is known of these enemies of childhood. If it is measles, we counsel a darkened room and hope the eyes will not be affected, but of measles we know little but symptoms and results. Is it scarlet fever? We watch for kidney complications and hope to avoid them. Is it mumps? Oh, mumps is simple, a very old and friendly enemy, in fact.

But what really happens?

In practically every case of infection there is a rise in temperature—a fever—and sucking on a

graduated glass tube registers its intensity but does not abate it. Fever affects the entire body—the entire organic structure. It is a slow cooking process which produces changes known as cloudy swelling. The extent of the changes in the body structure and the damage done to the system depend, of course, on the intensity and duration of the fever. The higher the fever and the longer the attack, the greater the probable and perhaps the permanent damage. The puzzled parent will argue that there is no visible manifestation of damage. He may be right.

But when the whole childish body is subjected to the heat of fever, it is understandable that the delicate and highly specialized glandular organs, placed for protection deep within the body, are the first to be harmed by the temperature.

It has already been noted that in male gonads which fail to descend from the body cavity (cryptorchidism), sterility is present. The cause was long sought because in other respects gland

action was normal. It was ultimately discovered that the sex cells are quickly affected by heat. Even the slight increase in temperature borne by the imprisoned cells was enough to make them sterile. The heating action of fever will be still more effective and if continued long enough is almost certain to be damaging.

The heart, the kidney and the ductless glands are tissues performing special or secretory functions. They cannot stand or withstand assaults like tissue which has no such special function. If they are damaged and scar tissue is formed, it must be remembered that scar tissue cannot function as specialized tissue; it is different tissue which corrects a wound at the cost of loss of part of the functioning area.

When, as often happens, one childhood disease follows on the heels of another—when there is a succession of attacks, with a short time for recuperation between them—the damage is very much greater.

Some of the endocrine glands, as already stated, function predominantly during early childhood. Others are not called on for complete functioning until after the changes of adolescence, particularly the gonads. But, apparently, all of them may be damaged if exposed to frequent rises in temperature in babyhood. No escape from this statement can be effected by proof that one or two glands did escape. The glands form a system. If one is damaged the others are affected, although there is variation in degree. Nor is there escape by pleading that babyhood fevers leave negligible traces. The real damage may not be observable for several years. In a dozen years the ancient causes of a present trouble will probably have been forgotten. At least, memory will be blurred and an inference will be of doubtful authority. It is, perhaps, not surprising that many childhood diseases are considered so trivial when the consequences are so far removed in time, and when there is seldom a fatal outcome.

The seriousness of this extremely serious problem lies not so much in the so-called cure of these childhood diseases as in their prevention. Prevention or partial prevention would check the ever-mounting number of defectives and emotional abnormals.

An idea of the frequency of these common childhood infections may be had by glancing at the statistics gathered in a single municipality. In Chicago, for instance, the U. S. Census mentions, among others, the following *reported* cases during the year of 1931:

Measles	12,229
Scarlet Fever	8,209
Whooping Cough	5,186
Diphtheria	3,145
Influenza	1,346
Mumps	1,916
Cerebral Spinal Fever	364
Infantile Paralysis	170
Pneumonia, all forms	7,937
Other Fever-Producing Infectious Diseases	28,012
	68,514

With an official population of 3,458,100 this would mean that only approximately twenty out of every thousand were stricken with one or more of these diseases. It must be taken into consideration that a large percentage of these reported cases occurred in institutions where the diseases were recognized. In many instances the parents prefer to keep the presence of these diseases hidden from the authorities because of the quarantine involved or, perhaps, because they are members of a religious cult that does not recognize disease, or because of carelessness. It may, therefore, well be true, as some authorities state, that mumps, for instance, in epidemics often attacks eighty out of every hundred children. In any event, infectious childhood diseases are far more common than these statistics indicate.

It will be noted that mumps is rather far down in the tabulation. The accuracy of the report may, therefore, be challenged, but the very smallness of the number of cases is vividly significant. Mumps

is so common that its presence is often not reported—so commonly disregarded that the physician is not called in. However, medical authorities consider it one of three most frequent childhood ailments (measles and whooping cough are the others). It is infectious and contagious and it is rarely fatal. It is most common, the authorities say, among children from five to fifteen years old and girls and boys are equally susceptible. We are dependent for accurate vital statistics on the records of about one hundred of our largest cities.

In many of these reporting cities as many as eighty out of every hundred persons have had mumps. In military statistics orchitis or testicular involvements occur in one out of every three cases. In civilian practice the number is placed at one in five. Another elaborate study places the quantity of gonad complications at sixteen per cent in males with twenty to thirty-five per cent when the disease is epidemic.

In none of the studies is mention made of ovar-

itis, the corresponding condition in females. The explanation is simple. Involvement of the male gonads is detectable because easily discernable; involvement of the ovaries in children could be discovered only by an operation, and later on, as has been indicated, the difficulty would probably not be attributed to an infectious disease of such ancient date as mumps. Estimates made on the basis of these actual studies and deductions fairly drawn as to females, lead to the conclusion that from six to twelve people of both sexes in every hundred in the reporting cities have suffered damage of a destructive nature as the result of mumps.

Some other infectious diseases, syphilis, for example, produce serious complications, which call for medical care and treatment during a long and varied convalescence, because they appear shortly after the acute attack. The infectious diseases which run a mild course and cause, not death but late complications, present the graver problem. It took many years to learn of the complication



DANCING BOY

Mumps took a toll of Donald—shuffled his emotions, turned him from family traditions, clipped his education and chucked him into nothingness on the stage as another dancer.

[See page 142]



LOUISE

Who was graduated from a beauty shoppe to the chorus. Her long legs, supple joints, slender hips and schoolgirl complexion—all deranged gland products—were business accessories that came as the price of

associated with a particular disease when there was a lapse of ten to twenty years between the time of the acute infection and the time when the complications manifested themselves or were discovered.

Mumps, despite its infectious stage and its many complications, has not attracted particular study because the disease runs its acute course in from three to ten days, and the usual complications—orchitis and ovaritis—last only from twenty-four to forty-eight hours. The immediate damage done is almost invariably undiscovered and may be detected only ten years or more later when the physician may not even connect the belated complications with the early disease.

What is the damage wrought by complications incident to mumps?

Orchitis (inflammation of a testis) impairs or destroys the sex gland or glands. The cells of these

tered, the results are in many ways similar to those that occur in males. But the physical consequences may be more pronounced and the emotional results will be differently manifested; in both cases there are likely to be curious conduct and interesting and pathetic eventuations.

It may seem remarkable that a disease with the allied pathology of mumps has not attracted the same intensive study as other infections. The reason for the apparent neglect is found in the fact that the secondary pathology does not show the kind of symptoms that lend themselves to such investigation. They come a long time after the acute attack and the disturbances are metabolic in character with a variety of manifestations. A first complication, as we have seen, may alter the growth of bone and change the duration of the growth period. Others show in teeth, hair and skin, indicating, perhaps, thyroid and adrenal complications. The advent of the menstrual cycle is deferred and the accessory sex organs fail to develop.

Mumps is undoubtedly the most common cause of infantile uterus with its many complications, and none likely to be discovered until the child-bearing age. Belated appearance of menstruation all but invariably foretells very early appearance of the menopause. And, finally, a very common form of obesity has mumps as the originating, if not the outstanding cause.

It is plain enough that the endocrine glands which are affected directly and indirectly by mumps are those which regulate conduct—which determine the qualities that combine to make up character or personality. Thus alteration of these glands and their functioning during or before the formative period of adolescence is reflected by changes which influence the entire future of the individual affected. He will be out of the normal zone and perhaps well into the field where eccentric conduct is the regular order.

Queer conduct, emotional variations from normal, can be studied to better purpose when there is

a definite pathological basis with which to associate it. Undoubtedly the time will come when mumps will be removed from the category of a simple childhood disease and given a new place in medicine. The disease has, in fact, received comparatively little study, perhaps because it contributes so little to the medical profession economically, probably because it is commonly considered so inconsequential. The money for such research as it has received, has come from endowments—small endowments and few workers.

But mumps is not an inconsequential disease because common, nor is it to be neglected because infrequently fatal. There is no remedy for it. The only treatment is rest and quiet—a treatment applied with difficulty and, therefore, with reluctance in the case of an active and slightly sick boy or girl. It is not amiss to recommend that parents take a long look ahead and consider again the thwarted career of William V. T. and the drab existence of Clara B. The latter is no less typical and appeal-

ing because we are disposed to grieve for her rather than with her.

The chain of consequences that often follows an attack of mumps contains many links and the links are of many kinds and sizes. Sex deficiency does not necessarily mean sense deficiency. Our parade of victims includes many who are bright, clever and well educated, but they are defective emotionally. They are usually infantile and, therefore, given to exhibitionism. Clara B. never grew up emotionally. We will consider Louise, another infantilist. Unlike Clara, Louise was thrown on her own resources at an early age. She was an orphan and was reared by an aunt who was none too willing to continue her responsibility longer than necessary. Louise found herself a job.

It might be thought that these infantile people would have difficulty in adjusting themselves to the conditions of a normal world. Often enough they do. Often enough their abnormality is a distinction and they fall into positions that seem to

due course she gave treatments to others. She had no need of them herself. She had a beautiful baby skin. She had the much sought and much advertised school-girl complexion. She didn't know how she had come by it but she often explained it at length.

It is not only or always an infant complexion that makes the competition of a Louise rather severe for the woman of normal development. The latter is usually puzzled by the other's abnormal endowments and often seeks to emulate them. But she is hopelessly handicapped. She can't reduce her hips by dieting or her breasts by binding. She can't make her legs longer or her ankles smaller by dancing—even by dancing in woodland dells in the light of the moon. She can't learn to kick the back of her head by practice or to put herself into the exact position of six by the hands of the clock. She may be even so normal that a quarter before six is beyond her powers. But she need not grieve over it. It is the other girl who is handicapped—

no less handicapped because she can market the eccentricities of her complexion and her figure.

The other girl in this illustration—Louise—was true to form. She was not hampered by shyness or halted by modesty. She never thought of the relationship between sex and modesty. Having very little of one, Louise had none of the other. Her emotional mechanism was sterile, although she herself may not have been entirely so.

When an actress-customer of the beauty parlor suggested that Louise had qualities that fitted her for the chorus, Louise was responsive and curious. Another actress-customer volunteered to show her the way. Not long after, Louise had qualified and she was a success, if the words fits the occupation.

Louise liked the chorus. It gratified her infantile desire. She found delight in the costumes and it did not occur to her that they were scanty. Exhibitionism is by no means confined to the infantilists but it is seldom that the infantilist is not also exhibitionist.

The interest of women in the beauty and the accessories thereto, of a Louise, differs from that of men, but men are interested. Louise had a liberal number of male admirers and added to them when she was released from the narrow confines of the beauty parlor. She was flattered by attention. She had been married three times before she was twenty-one, and hardly a week after each wedding, proceedings for divorce were filed by the disillusioned husband. It may be that chorus girls take the obligations of marriage lightly, but it was not so in the case of Louise. She was merely not adapted. Her charm was superficial. She was not interested in men as such, but she was persuaded by their appeals and blandishments. Marriage was a condition from which she was glad to escape.

The future for Louise is not to be predicted. She is an interesting example of a sexless woman whose handicap may or may not be offset by possession of some elements of beauty. There may be con-

troversy in that question, but her handicap, if handicap it be, is an economic asset. When Louise is not in the chorus, she is in the beauty shoppe. She lives a harmless life and travels a harmless route, disturbing only to the men who wish to marry her. She is an infantilist, somewhat of an exhibitionist—a victim of a pluri-glandular syndrome whose complications are practically certain to appear later. At the age of twelve Louise had mumps.

If a father or mother, together or separately, could understand the impulses, the urges or the forces that compel their children and drive them on to action or inaction, that make them lively, indolent, tractable, headstrong, selfish, generous, family life would be devoid of many of the breaks which too often mar it. The parents—and the children as well—would be spared many heartaches and disappointments. Kindliness and sym-

pathy would supplant harshness, and authority would be recognized for what it should be—an application of judgment based on experience and justice. Too often parental authority becomes parental tyranny; too often it is exercised irrationally or as a demonstration. There come occasions when a decision is adhered to stubbornly rather than reasonably. Parents have glands and emotions as well as children, but parents have had more experience. Their inhibitions are supposed to have been trained. Shall we say that they should know themselves as well as their children? Some of them undoubtedly do.

It is hardly necessary to say that mistakes of parents in their attitude toward their children cause jangles which the children bear up under only until they can assume their independence. Parents, unwittingly, often drive boys from home and girls into hasty marriages as their one means of escape. There is neither hope nor chance of making parents over but there is both of giving them an op-

portunity to understand that their children are not always responsible for their conduct.

It is natural that a father should be ambitious for his son. It is as natural that he should seek to direct the youth's course and education. Possibly the father is justified in being disappointed if the boy fails to come up to the standards set. The son's failure is usually interpreted as a reflection on the father and the father sees in it only his own default. A "no good" son is a disappointment. The difficulty lies in defining "no good" and in discovering the causes of it. "Like father, like son" may be as true as ancient but it is probably more ancient than true.

This father-son similarity is a theme much played on in the story books. It is one freighted with dramatic contrasts and inexplicable behavior which becomes finally explicable when referred back to the adage. It is much more likely that the explanation can be found in glandular derangements which are distinctly individual. A miser,

for instance, is a miser because his other emotions have been stunted and not because of hereditary trend or trait. A pituitary urge sends men and women off on strange careers of action and adventure. Gonad deficiency brings to the surface unexpected desires, tastes and ambitions and deflects victims from what would be normal to their environment. Romance does not come tumbling to distract the emotional make-up of unsexed youth, or it comes in some perversion of form to drive him along paths that are unknown to normals. The contrasts in the behavior of this class are sharp and baffling; one may develop surprising ambitions and the next have no ambitions at all. Another will sink contentedly into an occupational rut or lead a life that is colorless and bleak. Occupation, however, offers a false standard for judgment. One may be of humble station and indifferent employment and still lead an emotional life that is a riot of color and action. Another may hold high place socially and commercially and be dead emotion-

ally. But an occupation, whether it chooses or is chosen, may, in conjunction with other evidence, have a distinct relation to the underlying and impelling cause of behavior. The case of Donald is in point.

Donald was a disappointment to his father and a grief to his mother. His two older brothers and two younger sisters were humiliated by his conduct which led to his final estrangement. Donald himself did not grieve. He did not understand his family's attitude and cared little about it.

Donald's father was a prosperous merchant in a small mid-western city; his mother was a woman of education and culture and a devoted home maker.

Donald was the great family disturbance. He would not follow the beaten path along which his brothers had passed—one to a western university and one to an eastern. He wouldn't follow any path. He was a stupid and ambitionless school

boy in complete violation of the family traditions. His younger sisters caught up with and passed him in the classroom. His mother wondered and pleaded, his father fumed and threatened and Donald sulked or was indifferent.

Donald was not prominent or popular on the playground until he discovered, when he was about sixteen, that he excelled at high jumping. The only other sport for which he showed any aptitude was skating. He would begin at the high jump where his rivals left off and he could skate fancy circles around all his companions. Success in these games turned Donald into a "sporty" boy. He developed a taste for poolrooms and lowly haunts. He avoided companions of his own class. He was irregular in his attendance at school. He kept late hours. All of which brought his mother to despair and his father to action. The immediate cause of the action was the discovery that Donald's favorite indoor sport was setting up pins in a bowling alley. His brother, during a vacation, ran him

down and Donald was brought up for trial before the family bar. The father delivered judgment.

In the custody of his mother Donald was sent off on a trip to Europe. Change and new sights and surroundings, it was hoped, would be effective to alter his tastes and habits. The family was pleased. Something, at last, was being done.

After a tour of the larger cities, Donald and his mother installed themselves in a comfortable pension in Paris. Donald was to be occupied with sight-seeing trips, with a French teacher and guide, and was to be kept busy. In the beginning his mother accompanied him and the teacher-guide was always present.

Donald was impressed neither by the plan nor by what he saw. He disliked study and the French language. The Louvre interested him about as much as a long line of billboards. At Napoleon's tomb he asked who was the guy buried there. His mother was, of course, patient and persistent, but

the French teacher gave up. Donald began to wander about alone. He soon made the acquaintance of a young American who was a member of a troupe of acrobatic dancers appearing in an obscure cabaret. The two youths struck up a friendship. Perhaps they were emotionally attuned. As Donald expressed it, they clicked.

Donald went often to the cabaret. The dancing interested him more than the dancers, and the acrobatics as much as the dancing. Education, art galleries, sight-seeing and the French language were all forgotten. With his new friend, he held long discussions. Soon Donald took up dancing seriously and he was an apt pupil. The coördination which made him a good jumper and a superior skater qualified him for this new accomplishment. In a month he had progressed from cartwheels to handsprings; in another month he was throwing flip-flaps. The technique of it interested him. The manager of the troupe predicted a great future for him and Donald was delighted. He fattened on

flattery. In the fifth month he was introducing combinations of steps and aerial contortions of his own design. He received and accepted an invitation to join the troupe.

Donald's progress and achievements were paralleled by his mother's distress. At first she was a little surprised and a little interested. It was a harmless and diverting pastime. It was only a passing fancy. She was sure it would pass. A little later she hoped it would pass. Then she feared it would not. As Donald persisted, her concern changed to alarm and then to distress again. Acrobatic dancing did not fit into the family scheme of things.

In the beginning she said nothing of Donald's new fad in her letters to the family. Then she mentioned it casually, but when Donald announced to her that the worst had happened and he had joined the troupe, she could hold back no longer; she told the whole story in a letter that was a burst of despair. She had done her best and confessed com-

plete failure. Donald was deaf to entreaties and unmoved by tears.

Across the sea the news came as a new shock. The family discussion was short. The stern father was moved to a stern act. He cabled the disheartened mother to leave Donald in Paris and come home. He arranged a small allowance and the family went into theoretical mourning for Donald, the dancer. Their grief was somewhat assuaged when they learned a month later that Donald had become Raoul de la Tour.

The year following they saw him—and the troupe—in a Chicago theater. They were intensely interested. They applauded, but they did not understand.

Is it surprising that they did not understand? Not at all. They attributed Donald's conduct to eccentricity—to some quirk in his make-up. They searched the family pedigree for a parallel and found none. They forgot about Donald's childhood—scarlet fever, measles, whooping cough,

mumps, which came in rapid succession and left Donald a glandular syndrome that turned him into a creature of warped emotions, of queer urges, odd tastes, a condition that, in fact, evolved out of Donald a Raoul de la Tour.

The family was right about one thing. Donald had some quirk.

CHAPTER V

GIANTS AND DWARFS

IN THE summary of the endocrine glands in Chaper II, the thyroid was, of course, included. It is one of the most interesting members of the endocrine system and, perhaps, the best understood of any of them. Its hormone, or one of them, has been isolated and it can be artificially produced. Deficiency and excess of the secretion have known results. The diseases include myxedema and exophthalmia (protruding eyes) and cretinism (arrested physical and mental development), all severe and varied, and Mongolism or Mongolian idiocy is included among them. There are many variations of these diseases. They vary in intensity and somewhat in symptoms and in different locations. The thyroid is directly concerned

with the processes of metabolism and metabolic disturbance is always a result of thyroid derangement. The adrenals, the pancreas and the pituitary also have functions in the regulation of metabolism, as do the parathyroids also, so that it is plain that the relations of all of them with the thyroid are intimate. Thyroid derangement always affects the gonads to some degree and so the thyroid is apparently of consequence in every syndrome. The treatments for thyroid defects are well understood and in common use, but the conditions, traceable directly to the thyroid, are not germane to the present discussion. They are deceptive in few cases. The thyroid as a syndromic complication is of particular interest, however, because it often enough adds its portion to the severity of the condition. It intensifies the disturbances of the other glands, and they, in turn, apparently disturb the thyroid and so on. Decrease in mental activity, inability to concentrate, change in texture of the skin, protruding eyeballs, and obesity are some of the ob-

servable defects attributed to thyroid disturbance. Metabolism is always depressed and if the patients are young, growth is diminished. Lowering of the metabolic rate is the widespread consequence, but, for purposes of determining or discussing the influences on behavior, the thyroid is one of a chorus and not a soloist.

With this preparation we may now enter the realm of giants and dwarfs—of gigantism and nanism, of Goliath and Tom Thumb and the midgets, pygmies and Lilliputians—a realm peopled from the beginning with creatures real and legendary, and carried through the traditions of literature and folklore. It might be said that study of the endocrine glands has been, in respect of all these, a "debunking" process that has left the story tellers wrecked on the reefs of their imaginations. Their defenders might retort that Samson and Hercules are realities who have withstood the assaults of time and are not likely to succumb to the sniffs of science. However, science has left a little on

which credulousness may be fed and around which fancy may play. But it has not left much.

Scientists are generally agreed that gigantism is a disease; a few of them leave the door open a little by admitting that there are, or have been, normal giants. These few divide giants into two classes—normal and pathological—and the latter are products of deranged endocrine glands. But there is no agreement as to where normality leaves off and gigantism begins and, obviously, there can be none. One person designed by nature for a normal height of five feet six inches might be forced to six feet two by an over-active pituitary gland and so become a giant. Another patterned for six feet two might be forced to seven feet, and so on. The height may be only a partial index. Gigantism, as the result of a pathological condition, is, then, relative, although we are rather inclined to exclude men and women who are not of very unusual height. However, as in other results of glandular derangements, we will bear in mind the gradations

and call for a jury if the conduct of one not plainly a giant arouses additional suspicions. One not a giant in the ordinary acceptance of the term may be afflicted with gigantism.

The situation is much the same in regard to dwarfs. Certainly our scientists make no division of these small people into gnomes, elves, pygmies or such, nor do they include cretins—thyroid defectives—who are weak-minded or idiotic, but they must, and do, admit that there are normal little persons whose single peculiarity is their smallness. Indeed, there are several kinds of midgets to whose smallness pituitary derangements have, perhaps, not contributed. The familiar type, seen usually in the circus or on the stage, is the achondroplastic. The condition is due to failure of the body cartilages to develop into bone and the cause is unknown. There is another dwarf, the Lorain type, whose smallness is attributed to fail-

ure of the anterior lobe of the pituitary to function normally. If the growth hormone fails, the consequence, as might be expected, is a midget who may be otherwise normal. It is probable, however, that the growth hormone of the pituitary does not act directly, but through the thyroid and adrenals. Deficiency of this hormone is followed by decrease in size of the thyroid and atrophy of both adrenals and gonads, thus illustrating the relationships and the difficulties in fixing responsibility on a single gland. It also explains why treatment with thyroxine (secretion of the thyroid) may correct a defect ascribed to pituitary deficiency, and also why it may not.

The shortage of the pituitary hormone which controls growth may, of course, be small or large. Dwarfism, like gigantism, is, therefore, a matter of degree. Dwarfs come in all the undersizes. The achondroplastic type of dwarf may have a mental development that is normal or even brilliant and a behavior that fails to invite comment. Sex de-

velopment may also be normal, but it is more likely to be defective. The secondary sex characteristics will be imperfect and late in appearing. While there have been notable exceptions the life span is usually short of the average.

Making allowance for all variations and even admitting complete normality in many cases, the undersized individual will probably manifest his eccentricities in infantile behavior as well as in size. In this respect they differ little from their companions in extremity—the giants who are mostly behavioristic infants. Disinclination to make specifications may be waived, for the instant, to suggest that some exemplars of unusual dimensions, wrestlers and, less frequently, pugilists, often declare infantilism and are treated accordingly by those who exploit their special talents. This is also true of the midgets who become professional exhibitionists.

Omitting size, the dwarfs have much in common with the giants, which may not be surprising when

it is remembered that their eccentricities spring from the same source.

As in all abnormalities which arise from glandular defects, dwarfism covers a wide physical range. It may reach up to normal size and still show characteristic traits in personality. Cretinism (thyroid derangement) is now treated with considerable success, that is, the destructive processes are stopped and compensated for, growth is promoted and, in some cases, the individual is restored, at least physically, and remains normal so long as treatment is continued. But as much cannot be said for dispositional qualities.

In our gallery we have Loretta. She is a particularly interesting exhibit, because she reverses the usual order of regression from health to abnormality under gland derangement. Loretta first appears at the age of four as a cretinic example. She shows all the distressing facial characteristics—



REVERSING THE ORDER

A developing case of cretinism thwarted by treatment which restored physical form but not emotional balance.

[See page 177]



MUSTAPHA

A glandular syndrome caused a winsome baby to grow into a little old man who found a place for a misfit as a magician on the vaudeville stage.

[See page 188]

thick lips, rough skin, defective teeth, open mouth and stupid appearance. What cannot be seen or pictured are the weak, flabby muscles, the undeveloped nervous system and the low metabolism. Loretta was mentally exactly what her appearance proclaimed her. She improved rapidly when thyroid substance was given.

One by one the blighting defects disappeared, until, at the end of two years, Loretta became normal in appearance and developed ultimately into a rather attractive young woman. Her mental improvement, however, did not parallel her physical and her disposition became a jumble of inconsistencies and contradictions. She is not well educated or bright, but neither is she dull-witted. She is merely eccentric and usually annoyingly so. Loretta is married and Loretta is versatile in devising ways to make her husband miserable, with no intention of doing anything of the kind. Loretta will arise at four o'clock in the morning to take a walk in the park. She is likely to go to bed at five

in the afternoon and have dinner at midnight. Loretta succumbed to a drive for charity, but, instead of joining with the organization that aroused her charitable impulses, she took matters into her own hands, set up a grocery in the basement of her home, stocked it and distributed the items to anyone who appeared. There were many customers for two weeks and then Loretta wearied of it. Her husband paid the bills. She decided that her husband was making too much money; fortunately, he became aware of it before she could form and execute a program for depleting his bank balance. She yielded readily to his request for moderation, but immediately decided that she needed a dairy farm. Acquiring a farm called for steadiness and application; being devoid of these qualities, she presently forgot about the agricultural venture and determined to complete her education by a course of serious study. She bought numerous books, subscribed for a dozen magazines and hired a young college woman to come every day, read the news-

papers with her or to her, and discuss current topics. Her husband was delighted, and encouraged her, but her zeal was exhausted in a week and she sought new and less arduous diversions.

Loretta is neither sick nor crazy. She never grew up emotionally. Thyroid deficiency arrested her physical and mental growth and treatment restored one but not the other. It is a tragedy for the husband, but it's a comedy for Loretta.

In considering variations of so simple a case of domestic infelicities, the question of the possibilities of variation in the consequences of a glandular syndrome suggests itself. It may be important to gain an idea of the vast variety of results that come from derangements of the glandular system and its apparently eccentric members. What may the aggregate of manifestations be when translated into behavior? When it is asserted that science knows only a little about some of the glands

and practically nothing about others, the possibilities for complication become still further expanded. Even a slight comprehension of this may give us some appreciation of a condition in which derangement of one gland may produce such diverse results as a giant and a dwarf. A brief computation will serve to show the all but infinite varieties of conduct that arise when glands go awry and their chemical correlations become abnormal.

We will assume that there are twenty-four functions performed by eight glands. One of these may react on the other twenty-three to produce 6,624 effects. In such a computation no account is taken of the possibility that the action from gland A on gland B may not be the same as the action of gland B on gland A. When A acts on B, there may arise a new effect on glands C and D, because there is no basis for the assumption that the reaction from a pair of glands is the same as the reaction from one of them, or even similar to it. A pair of glands may, therefore, give rise to 253

new effects. As there are 276 possible pairs among the twenty-four functions of the glands, we have 253 times 276 or 69,828 possible results from the reactions of pairs of glands. If we take the glands by threes, we will find that there are 467,544 possible variations. By continuing the process we will find that the possible primary and secondary effects of these glandular reactions reaches the astonishing total of 1,358,954,196.

But the variations may not be dismissed at this point. There is more than a chance that the time necessary for these reactions to take place plays an important part in the number of variations in result. The reaction from one gland to another is not likely to be instantaneous. It may proceed rapidly in one individual and slowly in another; it may vary with the quality of the hormone or with other conditions and so lead to an entirely new series of complications. Glands are not concerned with the precision of mathematics, but mathematics may give us a very good idea of the

startling number of variations that may be found in human behavior as the result of derangements of the glandular system. The figures may seem fanciful and the conclusion exaggerated. It is not material. Micawber informed us long ago that human nature is various. Study of the endocrines serves to demonstrate that Micawber was right; human behavior has quite as much variety as is necessary and probably more.

It seems that there may be a rather large variety of dwarfs and many manifestations of dwarfism. For present purposes the type of particular interest is that in which the psychical characteristics of the child persist whether or not the physical development is the same. These provide us with an astonishing assortment of results; at the physical giants and dwarfs we may look with curiosity and wonder, but they also provide us with a more astonishing assortment of cases at which we do not look a second time. These are persons who appear to be normal, but are not in fact. Their abnormalities

and the causes might be discovered at the end of an elaborate investigation, but such investigations are not undertaken unless there is reason beyond discovering the fundamentals of eccentricity. However, the aberrations of these abnormals are challenging. Their conduct seems to call for an explanation. They seem not to fit into their environment or into the social and economic scheme. They find occupations that are unusual. The relation between the normality or abnormality of an individual and his occupational status is an alluring problem. A normal person of normal attainments may fit into a number of different positions, or find himself in harmony with a variety of social groups, but the abnormal one may meet with inconveniences. He may squirm about in the position in which he finds himself. His efforts at adjustment bring discomfort to himself and to others as well. He does what he has to do in the wrong way or at the wrong time. He is arbitrary or dictatorial or retiring and, perhaps, sullen. He may

resent direction and be worthless without it. The effort at adjustment may be active or passive, but it is misplaced persons and the struggle for placement which keeps us in a social and economic ferment. Society is constantly rearranging itself. Business is constantly seeking new adjustments—constantly searching out the right men for the right positions, and politics apparently, without hope of success, has a similar objective. The unadjusted and the unadjustable are the disturbing factors and dwarfism one of the causes. And not physical so much as emotional dwarfism.

If it is possible to say that dwarfism is mediocrity, we cannot discuss the subject. But dwarfism in its extension to the field of behavior becomes mental immaturity or emotional childishness. Causes of the infinite number of variations in behavior can best be illustrated by the pronounced cases of abnormality. If we can come to a passing comprehension of the extremes—of the causes, symptoms and results of serious disturbance of

the endocrine equilibrium, or even of the results regardless of causes—we will develop some appreciation of the cases which are not extreme. It seems to follow that even a slight knowledge of the forces that control human conduct might change one's attitude toward life and society and occupational fitness or unfitness or misfitness.

It is satisfying as well as important to understand the motives which impel individuals to act or not to act, to be able to measure the urge which drives men and women on, to have some grasp of the reasons why one is courageous and another cowardly, why one will work and another shirk, why one is assertive and independent and another is indifferent and retiring, why a violinist is a violinist, why one batter can clout home runs and another can not. A school teacher may not have chosen that occupation for economic reasons. Actors are not to be classed as exhibitionists because they exhibit their talents, but a politician is more than likely to be a failure if he has neither

the urge nor the capacity for display and no love for publicity. Exhibitionism in high degree is almost invariably a symptom of infantilism—of childish eagerness to win attention.

These and other manifestations are symptoms of excessive or distorted glandular activity. They are indications of emotional imbalance. To interested and critical observers, sins of emotional omission are no less attractive than sins of commission, but, whichever they are, as illustrations of human behavior, they make us wonder why.

The case of Mustapha is a typical instance of pronounced glandular disturbance. Science has put Mustapha under the miscroscope and determined with satisfactory exactness the cause of his dwarfism, his infantilism, his freedom from normal emotions. But, for present purposes, Mustapha also becomes an illustration of the social and occupational fortunes of a misfit.

Mustapha is his stage name. He came to a position in which a misfit fits by a dispensation which declares the wisdom of the selective process.

Mustapha was first discovered in a home for foundlings. He was a normal baby whose parents were unknown. He had a winning smile which made him a favorite with the nurses, and winsome ways which held the attention of a childless couple seeking to fill their void. This couple examined many of Mustapha's little companions, but, in the end, he was chosen. At the age of seven months he was taken away to a new home.

It will occur to the reader that if the couple who adopted this baby had been more careful in their investigations, their subsequent disappointment would have been avoided. Such a conclusion is without foundation. No investigation or examination would have indicated the future change in this infant.

For three years Mustapha grew and thrived. He won his way into the hearts of his foster parents.

Then he became ill, childhood ailments, but a succession of them. Scarlet fever, the first, was followed by whooping cough and mumps. The cases were not particularly severe and each time he made an average recovery.

Mustapha, however, emerged from these trials a greatly changed child. From bright and active, he had become dull and indifferent. He had forgotten how to laugh. He stared at his playthings with careless eyes. He was unresponsive to endearments and apparently without affection. His parents sought vainly to arouse his dormant emotions. They were glad when he came to school age. They hoped that new associations and surroundings would bring a change.

It was at the time when he began school that they observed Mustapha's failure to grow. In the three years that followed he gained nothing in height. He kept up with his class during this period, but he was not at all interested either in the school or in his companions. His appearance

continued to change; slowly and surely he was turning into a little, old man.

Thyroid, sex glands, and pituitary, science said, but other glands were probably involved. Lack of growth hormones inhibited development, resulting in dwarfism—pathological dwarfism and stunting of mind as well as body. Emotionally, Mustapha was all but dormant—uninterested, impassive, stolid, reticent and unconcerned.

He continued at school. He took no part in games or play. Watching his companions bored him. On their part, they came to ignore him. Now his disheartened foster parents made new discoveries. Mustapha was not only devoid of affection and sympathy and unresponsive to kindness, but he had no comprehension of the meaning of truthfulness. He lied plentifully but indifferently and was not in the least abashed when caught at it. His only concern was for his personal comfort and his meals, and he was not much concerned about them.

The bewildered parents surrendered. They gave up trying to understand him or his aberrations. When he refused to go to high school, they did not urge him. They held grimly to the responsibility they had shouldered and made no complaint. But there came a fortuitous occurrence. As in the case of Louise, whose peach-blow skin was her patent defect, Mustapha's deficiency brought him to notice and a new life.

One afternoon, after much urging, Mustapha went to a vaudeville theater. The featured attraction was a magician. Mustapha was not much interested. When the actor asked for the assistance of a volunteer from the audience, Mustapha made no response. But the magician spotted the diminutive figure and passed down from the stage. With much ceremony he invited the dwarf to the platform and the dwarf consented. The audience was amused as Mustapha waddled up the steps and more amused as he followed the directions of the master. The act was a great success and Mustapha

remained on the stage to its close. The next morning the magician sought out Mustapha's foster parents. He offered the dwarf a permanent position. And so, with their ready consent Mustapha left them forever. He probably never gave them another thought. But the misfit had found himself a niche into which he fitted exactly.

For twelve years Mustapha continued as the magician's assistant. He was indifferently successful and successfully indifferent. Gradually he learned the tricks of the trade; finally he became, through routine practice, fairly adept. He was interesting to those who saw him as a dwarf and more interesting to those who saw him as a dwarf who could pick a quarter out of a boy's ear and pull a rabbit from a silk hat. When his master died, Mustapha had no difficulty in continuing the act with himself as the star.

The turmoil and glamour of stage life, however, mean nothing to Mustapha. His emotional mechanism is sterile. He has many acquaintances but

no friends. There is no such word as sex in his lexicon. To him music is noise and play is not diverting. His scant education and mental lethargy forbid him the solace of reading. He finds the theater and moving pictures tiring, because they depict emotional stresses and strains which he does not understand. But he seems to derive infantilist pleasure from the applause he receives when he parades his grotesque little form before an audience. He lives for the daily three or four times fifteen minutes he is on the stage.

Mustapha is not a great magician, nor is he ambitious to become one. His fame does not extend beyond the second or third class theaters, but he is a success in his field. His earnings are, of course, comparatively small. As he lives for the minute, money means nothing to him. He is quite satisfied with enough to eat and wear and is not vain of his appearance.

Of course, the happy-go-lucky theater people take advantage of him. They borrow small sums from



MILTON OF THE ITCHING PALM

A man of single and intense purpose—no distractions, no diversions, no wife, no children—exactly what his glands made him—a banker.

[See page 201]



PIETRO

A rather pathetic story of an eight-foot man in something less than a six-foot world. Only while swimming was he secure from prying eyes. Mumps again, and a glandular syndrome.

[See page 200]

him and never repay them because he never asks. As he has a child's irresponsibility and fearlessness, they protect him; there seems always someone near at hand to look after him. We may say that fate is kind to him. He fills his place as an entertainer and if he is not in adjustment with society, it doesn't matter; neither he nor society knows it.

We are not privileged to proceed deductively in fashioning the influence of gland disturbance on the emotional structure of an individual. Measuring the disposition or temperament or accounting for eccentricities of conduct cannot be done with exactness when the variety of the possible is practically without limit. We can't say that an engraver is an engraver because he has an urge for meticulously fine work and that the urge springs from a certain and, perhaps, definite glandular correlation, or a certain, definite peculiarity of cor-

relation. But we are privileged, without infringement of the rules of reason, to investigate and ponder the relationship between occupational characteristics and dispositional traits, induced by or under the influence of glandular peculiarities. A flagpole sitter is, for instance, a challenge to the inquiring mind.

There is nothing in normal experience that accounts satisfactorily for such a manifestation of eccentricity. As an occupation it is idle, useless, peculiar, profitless and abnormal. It is not to be accounted for by the influence of environment or training or the need of achievement. A passing fad is a plausible explanation, but a fad is not a fad unless commonly indulged, and the flagpole sitters, like the building climbers or human flies, never become numerous. We would be reluctant to attribute such eccentricities of behavior to glandular adjustments if the compelling influence were not exhibitionism, the puerile desire for applause and admiration. Presumably the man idling on a

flagpole atop a twenty-story building reveled at the sight of staring groups exposing their tonsils on the ground below. He could gloat in silence and swell with pride; he was a cynosure—a center on which thousands, or hundreds or dozens of eyes were fixed. But the one who put on his stunt in a small town which afforded only a three-story structure, was in ear-shot as well as eye-shot of the spectators. His imagination was not the only interpreter of his glory. He could hear the jibes and jeers. He came down. His greed for applause was diverted and he doubtless sought new fields and other methods when his exhibitionistic tendencies remained unappeased.

It is not our purpose to account for flagpole sitting or to try to classify it as a form of self-expression. It is mentioned only as an example of emotional eccentricity, founded in exhibitionism, which is infantilism, which is a result of glandular derangement. Exhibitionism takes many forms and is frequently a result of political preferment.

Perhaps more frequently it is an incentive to the search for political preferment.

Often enough glandular maladjustment produces passivity or diverts activity into channels where subnormal emotional equipment may best function. Emotional abnormality, as has been pointed out, works in both directions. One deprived of motivation in one way will be moved and will desire to move in another. He will concentrate his efforts accordingly. He will perhaps become a great success because of his lop-sided, that is, unbalanced equipment. With the doors closed against emotional expression in many fields, intense application is possible in others. We speak here in terms of individual success which may be complete without the accompaniment of acclaim or admiration or envy, or hatred from the public.

The influence of endocrine adjustment on the

selection of occupations is very great. Selection may be interfered with by parental authority, by economic conditions, by environment but, in a general way, it is the determining factor. It explains variations in the divisions of employment, explains our personal likes and dislikes for occupational selections, our curiosity about some of them, our abhorrence of many and our attitude of revulsion or attraction to those engaged in them.

The idea of work as an undertaker generally is repellent. But there are many undertakers. Society's need for men to do such work is not the only motive that leads men into it. The work is by no means abhorrent to those engaged in it. Most of them like it. *And why not?* They are emotionally equipped for it. The idea of death does not shock their adrenals into activity. Their endocrine secretions are undisturbed at sight of grief and mourning. Their sympathy is professional and superficial. The day's work leaves them

unmoved. They are suited to their occupation and they seldom seek another.

Do men tumble into occupations by chance? No doubt they do. They take employment that offers. They must sell their labor and their talents. On the other hand, men are controlled by their tastes, by their likes and dislikes. They search out congenial occupations. They try and usually succeed in doing the things which they like or which they think they will like to do. The process of selection does not find them passive and unresponsive. They act or are acted upon, according to the strength of their feelings—according to the demands of their emotional equipment. They make many efforts. They try many things. They drift and fail if their impulses are weak. There is no tragedy like a misplaced man but there are, fortunately, a vast number who cannot be misplaced. They are the ones with no pronounced inclinations or clamorous talents. They fit anywhere or nowhere. They are as well off one place as an-

other. Their deviations from the emotional normal are inconsequential. They may be theoretically normal. They present no problem.

Milton, however, is offered as a type of abnormal who drifted into his position under emotional guidance. He started from scratch. He was buffeted by adversity, grew up in a shifting and uncertain environment and developed to a conclusion that was normal to his abnormalities.

In 1870 Milton first appears in this history as a five-year-old boy. He travelled with his father on the Western frontier. His father was a professional gambler and adventurer. He lived by his wits and was apparently devoid of such inconveniences as conscience or scruples.

Milton and his father travelled on horseback. Milton never forgot that early experience or that the horse which he rode was a roan and "ornery." Its ribs were obstrusively visible. Its gait was

shambling. Its ears were out of alignment and its nose was near the ground if unchecked. The horse his father rode was spirited and stylish. In the West a horse was a horse in 1870. A man's mount would be examined before the man and the man be judged by his horse.

All of which the senior Milton knew. The two riders would come to a town—a new Western town—board buildings, saloons, prospectors, cowboys. It was always the same story—a bragging father, a curious crowd, a challenge to a horse race, an acceptance, a wager or a dozen of them. Then the older Milton would become liberal. He would invite the challengers to select either of his two horses for the race. Invariably they chose the "ornery" roan and invariably the roan won. The departure of father and son was sometimes hasty but always successful.

When he was seven, Milton would ride the races. However, his father was versatile. He gambled in other ways. On occasions he drank

and Milton was left to himself. He had never known his mother. He didn't know where he was born, nor when. He was not rugged. If he ailed, his father would leave him in the care of some woman—Indian squaw or Mexican—and return for him later. The time came when he failed to return. Milton had been left in a mining town in Nevada. His father had given a miner's wife several gold pieces and asked her to look after the boy until he came back. After some time inquiries were made, but the only information was that in a camp a hundred miles away an unknown gambler had been shot in a quarrel with a miner.

Milton was not quite alone in the world. The miner's wife had become attached to him. When she died, he became a drifter. For a time he worked for an itinerant doctor whose books he read. He gathered other books from any source available. He was an avid reader but, aside from the medical books, his reading was limited to books on mining and engineering. He worked at

such jobs as he could find. He saved and he studied. He was more than quiet; he was silent. He was also respected. The dissipations of the mining camps had no attraction for him. His only vice was reading. His only ambition was to make money and keep it.

When he was sixteen he went into business. He made a bid and secured a contract to feed the men in a railroad construction camp. He fulfilled his contract to the letter. He made money out of it. His reputation for efficiency grew. He secured other contracts. He made money out of them. He saved money. He accumulated capital. He trained other men to look after the execution of his contracts. He developed a large business which spread over three rapidly growing territories.

Nothing interfered with Milton's attention to his business affairs. His devotion to money-making was complete and wholehearted. He bought horses and sold them. He bought a ranch, raised horses and sold them. He knew that well-bred

horses commanded a readier sale and brought better prices, and he raised good horses and sold them at better prices.

He lent money if the security was satisfactory and the interest rate was high enough. He invested in mines if they were good mines and the price was right. He became heavily interested in mining properties. When he was twenty-eight, he was rich. Hard times developed. Money was scarce, but not with Milton. He gathered in more mines at bargain prices. He added several ranches. Town properties, houses, stores followed one another in order and, finally, Milton opened a bank. He was the richest man in the country. His integrity was unquestioned. He was progressive, acquisitive, an upbuilder. He was a complete success.

The opening of a bank was the normal climax of Milton's operations. He was a banker from the beginning. He found no joy in producing or creating. That was work for others. He had no desire

to plan or construct a railroad, but he could and did supply the food for the men that worked at it. He never "prospected" for mining properties, although "prospecting" was the regular or intermittent occupation of half the men he met. But he was never far behind them when they succeeded, never far away when they needed funds for equipment and always present with the cash when distress compelled them to sell.

There are many kinds of banking and many kinds and types of bankers. Banking, as a means of financing merchandise in its progress from producer to consumer, is one kind. It is a service to business usually organized by business itself for its own convenience and accommodation. Banking, as the accumulation of capital in driblets for the purpose of financing large enterprises which may earn out the funds for repayment over a long period, is another kind. Bankers in these fields are men of figures, analyzers of statements, judges of credit and markets. They may or may not have the

grasping mind, the itching palm, the indifference to distress which is commonly associated with the calling. Indeed, they may be and often are genial, sympathetic and charitable. They may be classed generally as business men with an infusion of timidity added, the timidity growing naturally from the feeling that they are handling other people's money and are morally responsible for it.

But the true banker is the money changer in the temple; he is shaving his bit off another's coins. He takes his parasitic meed from another's toil. He profits not from service given by himself, but from misfortunes suffered by others. He loves interest some, but usury more. Shylock is his type, although Shylock's methods are out of fashion. The real banker is necessarily centered and unswervable. He is necessarily austere, unsympathetic, uncharitable although tactful and politic, and he is not to be blamed for it at all. His emotions are awry, super-normal, for instance, in which case his own gain or satisfaction leaves all

others in the ruck; or, sub-normal, in which case indifference to others, their welfare or their suffering, makes him impervious; he does not understand or appreciate feelings or desires to which he is not himself subject. He may be just, but he is always grasping. He may be generous, but he seeks no opportunity to express it. He may, in fact, be Milton, and for the same reasons. Milton had no friends. He never married. To him women were inexplicable manifestations of biology. Charity was a meaningless gush of emotion confined to fools. Life to him meant opportunity for profit. If he ever felt lonely in the big house he built for himself on the hill, he never mentioned it. He died in his wealth which went to endow a breeding farm for blooded horses—not a glorious ending, but typical of the victim of a pluri-glandular syndrome, the result of childhood infectious diseases.

Glandular derangements and variations in endocrine secretions undoubtedly justify the conclusion that man as a social animal as well as a bio-

logic specimen is the product of his endocrine glands. They put Milton into his place of detachment, drove him to his selection of business, doomed him to a career of loneliness and taunted him with the spectre of success.

But they performed quite differently for Pietro. This is not a fairy story, although Pietro was—and is—a giant.

Pietro is the son of the village barber in a town on the shores of Lake Michigan. The father, an Italian immigrant, is industrious and frugal as becomes the parent of many children. The children contribute their mites to the general support as soon as they can.

The oldest boy followed in father's footsteps. He went to work in the barbershop, sweeping up the shorn hair, wielding the whisk broom and shining the shoes. The second boy peddled newspapers before and after he left school. Three girls

helped with the housework as a preliminary training. But Pietro was not robust like the others; not even so vigorous as Carlotta, the next above him in rank. The madre, as Father Antonio often repeated, had had much worry over Pietro from the very beginning. Pietro appeared prematurely, which was rather foreboding. And the madre couldn't nurse him, which is, at the very least, a bother. She believed that this, more than anything else was the cause of Pietro's ailings which were practically continuous during his fifth year. First of all, Pietro had diphtheria, which was bad enough; but this was followed by scarlet fever, which was worse. Then came chicken-pox, an old enemy of the madre, but nothing to worry about. But in Pietro's case it was very bad. The doctor was called. However, it passed after a slow convalescence, only to be succeeded by mumps, another trifling incident of childhood. Three of the older children had had mumps at one time and what a nuisance it was with all three of them

fussing and wrangling in the house at once. Pietro was not very sick except for one day and it was soon forgotten.

After that succession of temperatures, Pietro was better. He ate well. He was interested in the usual childish things, but he was, as the family viewed him, a shy and rather timid youngster whom the others must protect. Often Pietro went with his brother to deliver the newspapers and when he was six he would attend the news stand for short periods.

In school Pietro became known as a peaceful, quiet boy. His deportment was in strong contrast with that of his brothers who were vigorous, noisy and excitable. He was more interested to watch games than to share in them. He preferred to be apart and he was never mischievous.

At the age of ten, Pietro began to grow rapidly. In a few months he was taller than any of his companions. In two years he towered above them all. His teachers seemed to think that his mental

growth should have been as rapid as his physical. They said that he should lead his class. But Pietro did not lead his class in school or out. Mentally, he was lagging behind the average. When he was twelve he was over six feet tall, a conspicuous figure wherever he went, but more conspicuous among his classmates. The more he tried to conceal himself, the more glaring seemed his height. He became self-conscious, diffident; silent. Of course, he was the target for witticisms and practical jokes. His remonstrances were unheeded. Sympathy for him vanished when he stooped on entering the schoolroom or when he folded himself on a chair because the school seat was too small.

Pietro remained away from school. He decided for himself that schools were not intended for boys nearly seven feet high. His absences were reported and his parents questioned him. The madre recommended punishment, but the padre, after a new survey of his giant son, disagreed. They argued

but Pietro was obdurate. He would not go back to school. He did not belong there. He didn't fit. He got himself a job driving a grocer's delivery wagon. He had found a place and meant to keep it. The grocer liked him. The customers liked him. He was prompt, dependable and accommodating. He was also becoming hardened to ridicule. He laughed good naturedly at references to his height, which was now more than seven feet.

About this time Pietro developed a fondness for swimming. Here was one sport in which his height was an advantage. He could crawl through the water at an astonishing speed and with astonishing ease. No one could make fun of him. His height was submerged. From early spring until late fall, cold or warm, rough or smooth, he spent his spare time in Lake Michigan. One summer he rescued several venturesome children. The village offered him a position as life guard. Carlotta said her brother should be good at it; he could wade if he couldn't swim.

On the beach Pietro became acquainted with a man who called himself a doctor. The "doctor" was, in reality, an itinerant vendor of patent medicines. He had a travelling show, an approved method of ballyhoo as a means of getting customers. In the fall Pietro joined the "show" of his new friend and became its outstanding attraction.

Pietro was tall, but a new top hat made him look taller. Pietro was long, but a tail coat made him look longer. Pietro's legs were lengthy, but trousers with perpendicular stripes made them look lengthier. Pietro would pass through the crowd in front of the tent before the ballyhoo began. He would stand beside tall men and look down on them. He would hear himself discussed and answer questions, often very personal questions. He would admit that he couldn't reach up and touch the sky, but say that he was intimate with the man in the moon. He played his part. He became skilled in the technique of exhibiting himself. And he hated it.

The "doctor" was delighted. Business was brisk. Profits were increasing. Pietro was the best drawing attraction he had ever had.

The "doctor", however, was, unlike Pietro, a social creature. He found kindred souls at every stopping place. He played cards. Occasionally, much to Pietro's disgust, he got drunk. He illustrated for Pietro not only the present but the future. The young giant wondered and was puzzled. He had no friends. He had no recreation. He was lonely, unhappy and a thousand miles from home. He pondered ways of finding more congenial employment. Was there anything he could do other than exhibit himself? He could think of none. But he could prepare for it. Something might happen. He would save his money. He began. He became miserly. He took as much from his scant earnings every week as possible. He kept his eyes open. Finally the medicine show came across a small circus whose manager saw Pietro. He offered the giant more pay. Pietro accepted. The "doc-

tor" pleaded and promised; he saw his prosperity slipping away from him. Pietro joined the circus.

But Pietro discovered that he had leaped from the frying pan to the fire. His freak companions were a sad lot. The circus quarters were wretched. His single consolation was that he could save more money. Week by week the roll in his pocket grew. Pay day was gala day. He was on the road to freedom. Some day, soon, he would have a place somewhere far away from tents and crowds and freaks—away from curious eyes and blaring bands and—Pietro fell asleep beneath his canvas roof. In the morning he woke to find his money gone.

Pietro grieved silently. He searched stealthily. The midget, Maia, surveyed his entire length sympathetically. She asked questions which were unanswered. She told Tipo, the clown, that the giant was sick—sick all over, and Tipo winked one eye and looked sheepishly at Pietro. But Pietro packed his small belongings into a bundle and walked away from the circus and from circus life.

With only some small change in his pockets, the bewildered Pietro looked about to find that he was in a seaboard town and a very long way from home. Night came. He was hungry and cold, homeless and weary, alone and friendless. He did not classify and catalogue his distress. He felt it. He looked about the squalid street. He heard voices singing. Across the way was a dingy mission. Evidently there was a crowd inside. The window was curtained nearly to the top, but he looked over it. He saw what seemed to be a revival meeting. There were rough-looking men and a few shabby women—derelicts and cast-offs. He entered.

Pietro's appearance in the mission had the usual effect. There were exclamations of surprise, mutterings and whisperings. The service was suspended for an instant. Pietro turned back toward the door, but was stopped by a kindly voice, which invited him to be seated. He arranged himself on a chair and listened.

When the meeting was dismissed, the white-haired preacher came and sat down by Pietro. Slowly the young giant's story was unfolded. It was given to sympathetic and understanding ears. Pietro stayed the night, stretched over a bed made longer by a chair. In the morning there were further conversations. The preacher asked Pietro to remain permanently. It pleased him to think that he could be an attraction in a poor mission as well as in a medicine show or a circus. He is an attraction. He is there still. Circumstances or a kindly Fate placed the glandular victim into a place where he fitted.

CHAPTER VI

The Pituitary and its Type

PHYSIOLOGISTS, pathologists and other scientists bound by hard rules of scientific evidence, always write with caution and speak with diffidence. They stand in wholesome fear that facts may not be facts at all; in fact, a fact is not to be recognized as a fact until it has established itself by hundreds of recurrences and reiterations and a single variation or exception upsets a whole trend.

"We are learning," writes one of these punctilious investigators, "that in addition to the control of metabolism, or rather in virtue of that control, the endocrine glands exert immense influence upon growth and development, and that their hormonic functions are ex-

ercised now in the direction of stimulation and now in that of restraint. Indeed it is not possible to conceive of a control which is wholly one-sided; the controlling agent must be able to curb as well as urge on. So we are led to think of inhibiting as well as exciting hormones, if that term may be so perverted from its original meaning."

The commentator in this case permits his reasoning to run ahead of his fact-knowledge. He is attributing to the endocrine glands and their hormones an activity or a control which he thinks they may or should have and hastens to save himself by referring to the encouraging progress and "our incomplete knowledge," and continues:

"We begin to see evidence of an interaction of the organs of internal secretion as members of a group of immense influence—a hormonopoietic system."

Again he cautions himself, and goes on:

"Here we are stepping on far less firm ground and we need to move with caution

lest our hypotheses carry us farther than our facts warrant. Yet the evidence is at least highly suggestive. We see how removal of a single gland, by operation or disease, is followed by changes in other glands of the group—changes that are best explained by removal of a wonted stimulus or withdrawal of a regulating control."

This is the scientific method of approach to glandular syndromes or pluri-glandular sclerosis. Clinically expressed there are, for instance, suggestions of hyperthyroidism, of pituitary defect, of genital hypoplasia and of Addison's disease, side by side, in the same patient.

The pituitary is practically a common member of every syndrome. It always invites consideration when any gland is affected. It has apparently intimate relations with all of them and some functions of its own. To the scientific elect the pituitary gland is known as the hypophysis. Like the adrenals it is a compound organ, consisting of a "glandular anterior lobe and a nervous posterior

lobe." It is rather larger than a bean and weighs half a gram, about as much as a dollar bill. It has been said previously that it is located at the base of the skull on a line back of the eyes, within a bony cradle called the *sella turcica* or Turk's saddle. Investigation and study of its functions have been made difficult by its inaccessibility but it is an organ of vast importance. It controls the growth of bones, that is the skeletal formation and therefore the size of the individual. Its derangement is probably the most important factor in making giants and dwarfs and it affects the gonads and thyroid and is affected by them if there is any disturbance. Hence comes justification for the assumption of close relationship when there is no disturbance. The secretions of the hypophysis are both exciters and inhibitors. They control the onset of labor in pregnant women. Animals, deprived of this gland, will develop young, but cannot bring them forth. During pregnancy, the gland, or its anterior lobe, enlarges and its cells

multiply. Derangements of the gland affect the brain and the vision, perhaps through pressure on the one and because of its position close to optic nerves on the other. Acromegaly is a disease caused by an "increase of function of the glandular hypophysis."

The pituitary, as a gland that has close relations with other endocrines, and as a controller and regulator, is a tremendous challenge to those who seek in glandular functions and activities an explanation of conduct. The physiologists are denied opportunity for close study of the gland in humans because of its position and have had recourse to animals. They have prepared extracts from the glands of cattle and made giant rats by treatment therewith. They have found one active principle of the secretion and added pituitrin to the pharmacological catalogue. But still there is the uncontrollable temptation to carry calculation beyond the narrow realm of scientifically recognized facts.

The pituitary, in its normal functioning, shares with the sex glands in control of behavior. In it seems to lie the spring of activity, of energetic application, of tirelessness, of diversity of interests, of the will to action and the desire to carry into effect great enterprises. There has come into use as explanatory of such energy and interests, the term "pituitary type." Women are as strongly represented in this classification as men—persons of size usually, but not necessarily, who "take hold of things," who declare qualities of leadership, who excel in action, who are undaunted by opposition and obstacles. They are not always regardful of others. They tread indiscriminately on others' toes. They move on to their objectives rather ruthlessly and often give affronts and invariably make enemies. They also accumulate admirers and followers.

These are the Babe Ruths, the Theodore Roosevelts, the Hills, the Harrimans, the pioneers, the pathfinders, whose ambition is without limits and

who win their way to recognition whether success or failure accompanies it. No other gland class approaches them for interest, for in whatever sphere they act, they win notice and, not infrequently, deserve it. But not infrequently, the restlessness and unceasing activity is without intelligent guidance and our suspects push themselves forward to no purpose and become mere makers of noise. Few of us have missed observation of a man or a woman who quests eagerly for notice in a public gathering, takes part in every discussion, becomes a candidate for committees and offices and so forth. When the desire for recognition is supported by the ability to discharge the duties, the desire is, of course, justified.

Noise and eagerness are, however, not necessarily manifestations. They are merely the concomitants of the make-up in some cases. The pituitary urge is likely to spend itself in mental activity, in quiet and thorough study and in persistent and unrelenting adherence to a policy or

an objective. This persistence, like all behavior based on glandular drive, runs a long scale of intensity with only the superlative degree inviting easy recognition. The superlative degree of pituitary incentive is all but invariably accompanied by physical conformations which are helpful in making classifications. These conformations include more than average and, often, unusual height. The height will be accompanied by bulk, that is, a large frame or massive skeletal development. There will be a tendency to heaviness and difficulty in keeping the weight down, but the appearance will be that of largeness rather than fatness. Expressions of surprise at the activity of so large a man or so large a woman will be common and will be accompanied by other expressions of surprise at the variety of his or her interests and his or her versatility. A pituitary seldom finds satisfaction in a single accomplishment. If *he* plays baseball, he will also play tennis or golf or football. If *she* plays tennis, she will also write books.



PITUITARY GLAND—NORMAL AND ABNORMAL

The pituitary gland in the center of the head is about the size of a hazel nut. It secretes nine or ten different hormones and this is what they did, working normally and abnormally.

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FROM PLUS TO MINUS

The physical, mental, emotional and commercial course of this mining engineer was in exact correspondence with the story the photographs so eloquently tell.

They rise to fame or superiority in one field only to seek its duplication in another or in several others. A woman who is so proficient at golf as to have accumulated twenty trophies, spends four hours a day at the piano, studies painting and is ambitious for a career on stage or screen. She is hampered in her ambition at the instant by three children, but looks calmly forward to the time of their maturity and her release "to do some things she really wants to do."

Pituitary restlessness is satisfied only by activity —by a single activity if it is sufficiently engaging to supply also variety and to use up the sum of the energy; otherwise new interests will be developed and new activities discovered. A pituitary editor, in addition to conducting three publications and doing "some general writing," was so addicted to study that he had a board across his bath tub to hold the book he read while indulging in his matutinal ablutions. He took his stenographer to lunch with him and dictated correspondence and

articles between mouthfuls, habitually had his assistants to breakfast and reserved his time from 11 p. m. to 1 a. m. for cultural reading. He had a marvelously well-developed plan for a new magazine, and when questioned about it, said that he made it one day "between one o'clock." He died regretting the things he had left undone, but looking forward with plaintive eagerness toward a new world of action.

A pituitary may be a great disturber or a great organizer and sometimes he is both.

None of these statements coincides with the scientific observations of the physiologists, perhaps, because the physiologist is compelled to his observations and calculations by direct processes, and analogy is always accompanied by doubt. The psychiatrists, the alienists, and others engaged in speculative analysis are more seriously disadvantaged. But the pathologist is in a better and more comfortable position. He can observe, compare and eventually he may have the

benefit of a necropsy to justify conclusions which he has not had the temerity to mention. "May have" is used deliberately, because the medical profession holds many doubters and many cases present alternative explanations which are confusing if not satisfactory. For instance, the evidence of a tumor on the pituitary gland may not be disputed but the consequences of it may be. One observer will say that the tumor, interfering with the glandular secretions, accounts simply and satisfactorily for the aberrations of the victim. The doubter may reply that the enlarged gland caused pressure on the brain with consequent conduct entirely explained thereby. Probably it depends upon the conduct. There was Jean, for instance.

Jean was the daughter in an old Southern family, jealous of its position and proud of its traditions. She was a tall, graceful girl, brilliant in her studies and famous for her kindly wit. The family

was the prouder of her because of her readiness in emergency and her initiative, but she had occasional outbursts of irritability, for which she always apologized and which they excused with a guilty feeling that they had "spoiled" her when a child. They did not relate her not infrequent and severe headaches to her irritability. Those were attributed to the rigors of an active social life.

One spring, Jean, rather impetuously, the family thought, married a young man of her own station in life. His avocation, if not his vocation, was big game hunting. She was delighted to accompany him on two long trips to Africa. After the return from the second trip, a son was born.

A year later the young couple departed for India, taking the child with them. This time they were in quest of tigers and found a tragedy. The young husband died in India.

Instead of returning to her southern home, Jean lingered in India, fascinated by the ancient civilization and eager to view and study its wonders.

She became interested in the old dances of the country and their religious significance. She first studied and then practiced them. She became adept and won popularity as a beautiful exponent of them.

From India her fame traveled to Europe and she followed, adding to her laurels wherever she went. Indeed one country, with an over-supply of palaces and no royal ruler, offered her one of them if she would agree to remain there and teach. She did not accept, but, yielding finally to the pleadings of her family, she returned to America.

Her relatives were appalled at her appearance. She was no longer beautiful. Her face had broadened. Her mouth was distorted. Her nose was changed. She was never without the headaches from which she had occasionally suffered as a girl.

Rest was prescribed and the attending physicians were reinforced by specialists. The lively, restless, tireless young woman had given way to a

listless, tired and very far from beautiful old lady. The x-ray showed an enlarged sella, indicating a tumor of the pituitary gland. Here was explanation of her conduct, of her eager pursuits, of her marked activity. Jean was in the progressive stages of acromegaly.

A pitiful case, no doubt. Acromegaly always is—the steady transformation from beauty to ugliness, from grace to awkwardness, from strength to weakness, from activity to sluggishness.

In due course, Jean showed aversion to any kind of exercise; the beautiful dancer who had delighted thousands with her marvelously graceful interpretations of an ancient art, died on the operating table.

Acromegaly is a disease characterized by the gradual enlargement of the peaked or acral parts —nose, lips, tongue, lower jaw, hands and feet— and by hyperplastic alterations in the entire bone

structure. It is accompanied, say the clinicians, very frequently by alterations of the thyroid gland, by derangement of the functions of the interstitial and genital glands and probably of the adrenals. Today it is recognized as the result of an increase of function by the glandular hypophysis.

Acromegaly, as a disease, permits conclusions as to the over-action of the pituitary gland. From observation of its consequences, among other evidences, comes knowledge of the influence of its secretion on behavior and of its relations to other glands. The knowledge is not great enough to warrant the statement that it is the disturbance of the pituitary which causes the peculiarities of conduct because it may be that the withdrawal or increase of the inhibitory influences of the pituitary react on gonads or other endocrines and the disturbance of their functions is the direct cause of the aberrational or changed conduct. In considering conduct in relation to glands, there is always return to the mathematics of glandular reactions

and the all but infinite variety of these reactions and their consequence.

But tests, experiments and observations have brought the definite determination that the pituitary, for instance, controls bone growth—skeletal development. Among its other symptoms, acromegaly invariably discloses changes in the bone system. Naturally the experiments have been extensive and naturally there is variation in results and opinions but there is none in the belief that in the pituitary is found the center and stimulus of activity, both physical and mental.

In these circumstances we refer those who are inordinately active, restless and aggressive to pituitary classification. The conclusion seems warranted that variations within the normal zone of pituitary activity account measurably for human conduct of this kind. In its earlier stages acromegaly is characterized by unusual restlessness, by a high degree of initiative, by an inordinate desire for accomplishment and, not infrequently, by out-

standing success in the calling the subject follows. Finding similar conditions in many who never develop the disease, we naturally attribute them to the same source—unusual, but not pathologically excessive activity of the hypophysis, or hyperpituitarism.

For a comparatively long time John F. came within the pituitary type classification. John's father was a professor of chemistry and he himself had unusual opportunities for study. He was a brilliant student and a leader in college activities and sports. He declined to follow his father as a teacher; his ambition ran beyond an activity so tame and circumscribed. His desire was to conquer difficulties, to wrestle with the stubbornness of things; he became a mining engineer and found his first position in the Southwest. He was immediately successful as his friends expected of a man of his size, stature and equipment. Promo-

tions came rapidly. At the end of three years he was general manager of a large enterprise in Mexico, happily married, and the world he was bound to conquer still before him.

In Mexico came a change, not in the world, but in John F. The first indications were recurrent and maddening headaches. He fought them off for months, mentioning them only occasionally after the beginning. But he could not suppress or conceal his increasing irritability. His silence became morose. He finally suspected the climate, surrendered his position and returned to New York. His condition showed no improvement. The headaches continued. He lost his initiative and made no attempt to find another position. His disease had progressed from the stimulating to the destructive stage. To escape the pain which had become constant, he drank increasingly and then became a habitual user of morphine. His wife, who was at first sympathetic and tolerant, was unable to cope with the situation. She was possibly justi-

fied in thinking his behavior was controllable. She despaired when his resources dwindled away and, humiliated, she finally appealed to her father for assistance.

John F. was called on for an accounting and explanation. He met the accusations, the pleas and the promises with a sullen apathy against which all arguments proved futile.

His wife followed the advice of her parents and left him. John F. disappeared.

For five years he seems to have wandered, instinctively attracted by his former calling. Eventually a watchman of mining tools, he was recognized by a brother engineer but only after close scrutiny. The one-time alert and upstanding mine manager was heavy featured, slovenly, dull-witted and forgetful. He answered some of the questions asked in rasping, guttural tones and made no effort to come out of his stupor. One morning he was gone again.

Several years later he reappeared suddenly at his

boyhood home. Unwashed, unkempt, he slouched up to the kitchen door, bringing despair and heartache to his aged parents. They could learn little from him of his mode of life or where he had been. His once brilliant mind had forsaken him. His dull eyes stared stupidly and the pathetic joy of his parents at seeing him left him unmoved. He reëntered their lives with no expression of pleasure or appreciation. His habits had become primitive. Unless forbidden, he would eat with his fingers. He forgot to comb his hair and had to be bathed like a child. He seemed content to sit apathetically and brood; in appearance and conduct he was a grotesque, slovenly dullard.

Fortunately for John F. and his parents, the cause of his pitiful condition was recognized by a professor of medicine called in by his puzzled father. A pronounced case of acromegaly. The discovery made no difference to John F., but much to his parents. He lives today, having such attentions

and comforts as he needs, but wholly unconscious of them and unchangingly indifferent. But his parents now understand.

Possibly there is no lesson in the tragic career of John F. Except for the physical pain, the disease made him unfeeling; he was emotionally atrophied. As a brilliant student and competent executive he deserved and received admiration and respect. As a sick man he received less than the sympathy he deserved. He was deserted, denounced and shunned until acromegaly was recognized.

Similar unfortunates fare similarly. It also occasionally happens that the gland derangement is not permanent. Mysteriously there is a return to normal functioning. In such cases it happens that changes have taken place, not visible, but sufficiently severe to affect conduct and, perhaps, to make the victim undesirable and his behavior inexplicable. They may be found in workhouses or institutions for the insane where their apathy has

been miscalled stubbornness or their mental dullness has been termed differently.

It is the infinite number of gradations between normal well-being and pronounced acromegaly that add to the difficulties of detection and diagnosis. Only a small minority of the cases are ever accounted for. The usual way is to attribute the observable changes to whimsical indifference or headstrong disregard for the amenities of life and thus each tragedy is intensified.

It is when the acromegalic wins early renown of some kind that his later tragedy becomes more poignant. "The higher they rise, the harder they fall" is the slang for it, and James W. rose high—high in the world of baseball. He was the big fellow with the reach, strength and endurance necessary to make a great pitcher and a great pitcher he became.

Strangely enough, James was born in the interior

of China. His parents were missionaries—a brilliant couple who were graduated from a small sectarian college in the same year. He had long before decided on missionary work and she decided to share his lot. Together they departed for the Far East and eventually they established themselves far in the interior of China. Their nearest white neighbors were three hundred miles away. But they were content, and rejoiced when a son was born to them.

The training and education of this boy was the work of their leisure hours, his future the dream of their isolation. He responded to their attentions in a manner that surprised and delighted them. He was avid for knowledge. He absorbed all they had to offer. The time came when their supply was exhausted. If James was to develop as he promised, he must have opportunities and associations not to be found in Central China.

They returned to the States and placed James in the high school of their native city. If they had

any doubts they were soon dispelled. James quickly won recognition for his ability, and for his energy as well. As if in compensation for the lean years in China, he became intensely interested in athletics—all kinds of athletics but particularly baseball. He became the pitcher of the school team. He became the pitching sensation in that field. His fame spread. When he was sixteen, the scout of a minor league team looked him over. An offer followed. James was greatly flattered. He wished to accept it. He said it was his chance. But his parents were not flattered. They saw the house of their dreams about to tumble. The plaudits of the campus seemed a small matter to them. They told James plainly of their long-cherished plans, of the college work ahead of him, of the future that surely awaited one of his talents. Their arguments prevailed.

James went to college. Again his ability made him conspicuous. Again he became a leader on the athletic field as well as in the classroom. His



"A BASEBALL HERO"

Acromegaly makes as well as breaks—an over-active pituitary made this youth a fine student and a great athlete—it made the great athlete, first, a failure, and then a pitiful distortion.

[See page 240]



ONLY A CARPENTER

A wayward pituitary gland decided, after twenty-eight years of orderly activity, to make a few architectural changes. Science calls the result "Acromegaly."

[See page 315]

reputation as a pitcher had preceded him. He made the team. Again he became the pitcher and again a sensation. He had "everything on the ball," which seems to mean speed, curves, changes of pace and knowledge of the batter's whims and fancies. His fellow students dubbed him "Big Jim," and Big Jim he was to the inglorious end of his conquering career. His hand, broad and thick, was studied by anatomists and photographed for the newspapers—a marvelous hand with blunt fingers before and a sturdy wrist behind. There was a "hop" on the ball when James threw a fast one and it faded away when it received the last squeeze from his stout fingers.

James went to a minor league club at the end of his junior year. This time there was no argument, no discussion. There seemed to be no alternative and his parents nursed their grief in silence.

A year later James went to the big league. Still a sensation, he consumed a million dollars' worth

of what would otherwise have been good advertising space in the first season.

James was not given to boasting, but he was quietly pleased with himself. He knew his capacity. His head, by his own estimate, was quite as valuable to him as his arm. And, at his first trial, he had found something that demanded all he had to give. He concentrated on baseball. He could field and he could bat. He was one of the four leading pitchers. He was the best batting pitcher. He was assured of a long career; when he could no longer pitch, he would be wanted for other and obvious reasons. He received a high salary. He was able to ease the family financial burden. He was idolized by the multitude. He was a national hero. He was set.

The fact was, however, that James W. was a pituitary mess. He was cashing in on the excitation of an early acromegaly. He was slowly approaching the destructive stage. In due course he began to have lapses. His head in recurring in-

stances helped out his failing arm. His fingers were losing their strength, his wrist its flexibility. He would "blow" after three or four innings. "His public" became impatient. There were ugly rumors as the usual expression of dissatisfaction. There were direct and tantalizing remarks from hypercritical fandom. He was learning that public hostility lies close to public favor and that fans are fickle. In the end he was benched. He became an emergency hurler. In this position he had a revival of form and of hope. A dozen times he pulled his team out of holes and turned defeat into victory. But he could not "go the route." What aroused the curiosity of his fellow players was his apparent satisfaction or his plain indifference. The following season he was back in the minors. He was becoming sullen, silent, apathetic. One of his fellows argued with him one day in an effort to stir him out of his lethargy. James listened in silence. He made no reply to queries.

"What th' hell! Snap out of it," shouted his

friend in disgust. "Say something. Spiel, you dummy!"

Big Jim looked at him dully and said:

"Sic transit gloria mundi."

"Now, what th' hell did he mean by that—Monday?" asked the player later of the manager. "It ain't Monday with him. It's every day in the week."

James W. was given an unconditional release in mid-season. He returned to his parents. They were naturally shocked by his appearance and puzzled by his behavior, although the acromegalic changes had only begun to become visible. Once begun, however, they developed steadily. The father watched, with dawning comprehension, the transformation. The physicians confirmed his suspicions. The great pitcher had passed. James W. followed, a hopeless acromegalic, denied the promise the pituitary made and defeated.

Even when cast in lowly places the acromegalic will flash before he fades. Herman is a carpenter.

He was a carpenter in Lithuania before he came to America, certain of his ability to make his way in the new world. At twenty-three he was a success with a reputation for dependability and efficiency. At twenty-six he was a contractor, noted for his energy and persistence. He was successful in winning many building contracts because he could complete the work in shorter time than any one else. He had drive, but if he drove his workmen he did not spare himself.

In due course, Herman became the head of a family. He owned a modest home and conducted a modest business. He was a leader in the small field in which he operated.

Herman was a man of average size and build. He wore a No. 7 hat and a No. 7 shoe. He was lean and agile as became a good carpenter. His first intimation of any change in his physical make-up was the increase in his shoe size. The increase came slowly but each succeeding shoe purchase brought a pair of larger dimensions. His head grew also. In a year or more he was wearing

a 7½ hat and a No. 9 shoe. He became restless. His sleep was irregular. He had violent headaches. But he stuck desperately to his business. His hands, once strong and deft, began to broaden. His fingers became thick and clumsy. His face was changing—growing broad and bony. His tongue seemed to be getting thick and unwieldy. The neighborhood physician was puzzled, but thought it would pass. He prescribed for the headache. But Herman's head, hands, feet and tongue continued to grow and coarsen. His eagerness diminished; his strength vanished.

Now, at the end of ten years he is a pronounced acromegalic. He wears an 8½ hat, a No. 11½ shoe and his hands are more than seven inches wide. For a year he has been unable to attend to his business. His savings have vanished, his home is mortgaged and the future holds neither promise, nor hope. The tragedies of unarrested acromegaly are almost invariably the same—a period of excitement, great energy and success, a period of

lassitude and failure, followed by decay and tragedy.

The pronounced physical changes do not always appear. The dispositional traits only are manifested and we have the eagerness, the climateric of success and decay without possibility of diagnosis or action. In such cases—and they are not so infrequent—we hear of baffled physicians, but there are no explanations beyond wagging heads and vague assertions about the victim's "going to pieces." Men may go to pieces without becoming acromegalic or having a tumerous or disturbed hypophysis, but there is a flow and an ebb when the pituitary is deranged that challenges more than the imagination.

Emily was a poor girl, normal in origin and early development. She traveled the beaten path through school to employment as a means of independence. She contributed to the support of

her family. She attracted friends. She shared in their joys but her sorrows were her own.

Acromegalic disturbances come slowly and insiduously. The thickening and broadening is painlessly steady. The victim infrequently associates the spreading toes and fingers and flabby lips with the violent headaches that progress from intermittent to constant. Indeed, many of them have testified that the head pains were so severe that their attention was diverted from the physical changes that were taking place.

It was so with Emily. The early photographs indicate clearly her natural attractiveness. It is a long distance from the budding child to the distorted features of the marred woman. It was as far from the normal hands and feet to the widened and coarsened fingers and toes of the acromegalic. But the distance in time was fourteen years at the most and probably ten years was the full compass of the disintegration and transformation.

The unfortunate Emily seems to have missed the

slight compensation which acromegaly not infrequently grants. She had little of the enlarged activity, the sharpened faculties, the pronounced talents or superiority which come as a first result of the onset. It is in this period that the acromegalic is likely to win attention and commendation for performances that are outstanding and the performances may be physical or mental. They may be won on court, diamond or in ring or arena, or in literature or music. If there can be any compensation for such an affliction, it may be found, possibly, in records of such ability or achievement. If it so happens that the acromegaly is arrested—which may occur before discovery of its presence is made—the one afflicted may continue at the peak of the stimulation effected by the hormonic secretions.

But Emily was not among those whose glandular integrity is righted of itself. She suffered and declined. From comeliness to ugliness, through all the intervening stages, she passed in a steady pro-

gression to the inevitable end. She died at twenty-four.

This man—No. 14372—floated up from the dregs to win recognition as a criminal and a murderer. Of his past life he had dim memories but on one occasion the dimness vanished and from some hiding place he abstracted the photographs which indicate that in his boyhood he had a home and, perhaps, normally pleasant surroundings. Possibly the facial expression should not be scanned too critically. In the depiction of the physiognomy of a criminal we always fancy that we can see the traces of his career and presumable mode of living. But there is no certainty that No. 14372 was a criminal although he was a convict.

Two years before the homicidal act which made him a "lifer," No. 14372, who at the time was known as a derelict, came under observation of a physician and aroused his interest. After exami-

nation and investigation the physician found that the man undoubtedly had a pituitary tumor and that, in his opinion, he was potentially dangerous.

The man, however, was not insane, and there was apparently no way of depriving him of freedom. The law and the courts cannot move to prevent crime. The entire machinery of justice is devised to detect and punish or, if not to punish, to remove a threat to public peace and safety. But only one who has actually committed a felony may be so removed for any length of time and only an insane person is considered irresponsible. The law acts after the fact.

No. 14372 continued in the enjoyment of his freedom. He killed a man. The act was committed with apparent deliberation and little attention was given the testimony that the pituitary tumor should be considered as evidence of irresponsibility. The reply invariably was that he was sane.

"In your opinion, is he sane or insane?" And the statement was always answered by the question:

No. 14372 was convicted and sentenced to life imprisonment. He may have been a tough character and a social menace but he was a mild convict except on two occasions. Once he beat his cell mate, apparently without provocation, but possibly not, and once he attacked a deputy warden without, however, doing any damage.

Of his two years in prison, one was passed in the infirmary, the last three months in bed. He failed gradually and died quietly. The autopsy disclosed the presence of the pituitary tumor. There were visible no evidences of acromegalic changes, but his conduct and his physical and mental decline closely paralleled the course of that disease.

CHAPTER VII

OBESITY

HERE is a definition.

"Scientifically defined, obesity is a metabolic disorder resulting from endocrine dysfunction and is characterized by a tendency toward the laying down of excessive deposits of fat throughout the body."

The common synonym for obesity is fatness. Fat is a word of Anglo-Saxon origin. Used with or without modification it contains a measure of opprobrium. There are other synonyms less eloquent and more polite; for instance, corpulency, adiposity, pinguescence, polysarcia, lipomatosis universalis. The last would, perhaps, test the terminological capacity of a physician who might or might not know that Adipositas Dolorosa is also

Dercum's disease and quite as dolorous as its name signifies; in fact, obesity or fatness is always sad, annoying, disagreeable, often dangerous and never amusing.

Obesity is a disease and it is associated with or caused by or results from endocrine disturbances or derangements.

That statement is likely to be challenged. We hasten to say, therefore, that the best scientific thought today looks to fuller knowledge of the ductless glands for the solution of the problem of obesity.

There must be and, in fact, there are many kinds of obesity and many causes for it. There are many manifestations of it. There are persons who are fat inside and not outside. There are persons who are fat in one place and persons who are fat all over. There are thin-legged men and women with aprons of fat over their abdomens. There are women with concentrations of fat on arms, breasts or hips. There are fat babies, fat children, fat

young people and fat old people. They are all victims of a deranged metabolism, and the derangement is naturally traced back to the endocrine glands which regulate everything.

The number of disturbances and derangements resulting from the interplay of the endocrine glands has been previously indicated with numerical sufficiency, if not with mathematical accuracy. When these glands are in normal relationship and functionate as intended with all inhibitory processes in order, they are not unlike an orchestra playing in perfect rhythm under the direction of a skilful and competent leader. The result in the case of orchestra is a perfect blending of instruments, each contributing its exact notes at exactly the right times to form an interpretation of a composer's musical ideas. Harmonious blending is indispensable. The piccolo and the bass viol may contribute in small portions or proportions and the bassoon may deliver a single oompah during a long rendition, but none can be omitted without

marring or jarring the perfection of the whole. To the untutored ear slight infractions of pitch or rhythm may be unheard, but they do not escape the leader.

The orchestra, however, like the ductless glands, can function without order or without a leader. The instruments may be blown into, or pounded or sawed upon, whether or not the players have notes before them or a leader to guide them. Without notes, without direction, that is, without inhibitions, there will be neither rhythm nor harmony. But there will be sound—raucous, ear-splitting, nerve-racking: it will come from the same instruments and the same players, but we will class it only as a terrible noise.

The endocrine glands are like that. In dysfunction they are like a leaderless orchestra or assembly of musical instruments, each one playing by itself and for itself, or without restraint, producing a vast amount of noise but no harmony, no melody. It is a sick orchestra.



EMILY

"Well begun is half done" is a good adage but a poor rule when the pituitary goes wrong. The outcome of acromegaly was in Emily's



No. 14372

"A pituitary tumor and unbalanced emotions," said the physicians before the crime. "A murderer and a long prison term," said the law after it. The post-mortem showed the doctors were right. Was the law right also?

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When the glands are out of tune and still play, they make a great hub-bub in their vicinage. And so we have it that a fat man is a din—the product of a clash of glands, the living demonstration of a rhythmic disturbance. He or she (and there are many more she's than he's) is the home of an orchestra of glands, each at odds with all the others and each working as if determined to drown the others out. The din may be as great, in fact, if a gland or two sulks and declines to contribute to the disturbance. It doesn't help to call the piece a syndrome instead of a symphony or to close the eyes instead of the ears. Obesity is loud even when not noisy. It always speaks for itself. It is more than annoying to its victims, and the fear of it comes with the first symptoms. It may well be feared.

A woman with a skeletal structure designed to carry 110 pounds of harmoniously disposed muscle tissue, organs, etc., is transformed by the clash of glands into 280 pounds, largely fat. She is out of

tune and the din is multiplied accordingly. The heart, designed to pump blood for 110 pounds is called upon to supply circulation for more than double the weight. It is an honest heart and tries honestly to perform this big job. It delivers one hundred strokes a minute instead of seventy-two. The result is not wholly satisfactory. The reserve power is greatly reduced. Working steadily beyond its normal capacity, it falters if called on for still more. The 280 pounds is not so mobile as the 110. Movement is, therefore, distressing. The lungs receive less blood than they should have. When the lady moves, she pants. Other organs are called on for more service and they also make demands on the heart. Their demands are only partly supplied. They struggle. Their efforts expand the distress areas. The lady finds that she is more comfortable, or less uncomfortable, when she sits quietly. When she sits quietly she burns less carbon and probably gains a little weight, having a tendency in that direction. Thereupon she is classed as lazy as well as fat. Fat

and lazy are twin words in denunciatory description of fat people. Her friends are disposed to believe that she is fat because she is lazy, whereas she is lazy—if lazy is the word for it—because she is fat. Whatever are the immediate causes that contribute to her condition, underlying them is her glandular orchestra, playing out of tune, and, perhaps, destined to continue its tuneless course to the end.

Obesity, as a subject for scientific study, is necessarily modern. The very modern view lists the predisposing causes as heredity, age, sex, temperament, race, climate, occupation, previous diseases and internal secretions. The list is sufficiently inclusive and the reasons, in specific cases, are not always impressive. Heredity, for instance, may be dismissed with the comment that a habit of living is at least as likely to be transmitted as a definite constitution.

Age must be recognized as a predisposing cause

because the evidence is obvious. Obesity is definitely associated with life cycles. It varies only in the degree in which it manifests itself. In women it is more than likely to appear in mature life, between the ages of thirty and fifty. In men it comes between forty and fifty. It is more common in females than in males. The proportion is as high as ten women to one man. Child-bearing is an important contributing cause. The menopause is all but invariably followed by increased weight.

Infectious diseases with their resultant glandular disturbances are naturally listed but they are not primary causes. The relation of the gonads to obesity has long been known. Fat deposits in the skin appear in both sexes at puberty. Eunuchs are notoriously stout. Thyroid and gonads are sympathetically related and hypothyroidism manifests itself in increased weight. Alterations in the functional activity of the pituitary gland are followed by general adiposity. In any

case the direct cause is to be found in the metabolic efficiency.

There is some definiteness in the relation of obesity or some forms of it, to particular endocrine glands. Scientific discussions and differences are, however, beyond the scope of this treatise and outside its purposes. But slipping over the edge may at times be clarifying. It seems necessary to say that at the present time it is customary to divide obesity into two principal types or groups—exogenous and endogenous. By the former is understood the form of adiposity which comes from over-eating, indulgence in alcohol, laziness, sedentary habits, etc.

The endogenous type includes those cases in which the obesity results from endocrine derangement or dysfunction. The classification is not satisfactory because it offers no explanation of why identical diets induce different results in two persons leading the same kind of life. On the other hand, a recent extensive study clearly showed that

changes coming with puberty and childbirth brought obesity with them in more than half the cases recorded.

Such studies, it is pointed out, decrease the importance of diet and exercise and point strongly to the ductless glands. The immediate exciting causes of obesity, it is concluded, appear to be due to the ingestion of abnormal amounts of food, of alcohol, and insufficient exercise with an obscure endocrine dystrophy (perverted gland action). The latter overthrows the weight-regulating mechanism of the body by an imposed economy of metabolism and consequent excessive storage of fat.

Obesity is dangerous as well as annoying. It shortens life, as the statistics of the insurance companies prove. It lowers resistance and therefore increases susceptibilty to disease. A fat person will ordinarily be sicker than a normal or thin person, yield to treatment less rapidly and recover more slowly. Obesity is regarded as one of the two pre-

disposing causes to diabetes. Diabetes is, in fact, considered as one of the penalties of adiposity. Its frequent occurrence in fat people is attributed to the burden that the increase in body mass imposes on the pancreatic function. It may be added that recognition of obesity as a menace would do more than anything else to check the increasing frequency of diabetes.

Diabetes is, however, only one manifestation. Increase of the body mass imposes extra work and eventually strain on most of the vital organs, particularly on the heart, liver and kidneys. The organs may also become degenerate through fatty deposits in or around them, or through fatty infiltrations. The list of complications is a long one and the results are many, varied and never good.

Clinicians recognize two main types of fatness—the plethoric and the anemic. There is no mistak-

ing the former. Plethoric obesity is apparently healthy and boasts of it good-naturedly. It suggests good living, plentiful food and enjoyment in eating it; liberal drinking and the attendant pleasures. Investigation shows floridity in the complexion, and activity of the sweat glands. Of course, the neck is thick and the abdomen prominent. The breathing may be a bit wheezy, but in a general way the suggestion is of strength, not of weakness, of health, not of illness, of an abundance of force and reserve, and not a deficit.

If the obesity remains of moderate degree, the person is fortunate. But the tendency—the underlying cause—that has produced the moderate degree is not always content with a little. Cardiac decompensation is likely to develop and involve other organs or become involved with them and the wheeze becomes cardiac asthma. The once full and strong pulse becomes weaker and there accompanies or ensues, in addition to cardiac and muscular weakness, such things as cerebral hyperemia,

vertigo, cerebral hemorrhage, orthopnea, cyanosis, pulmonary edema, arteriosclerosis, chronic bronchitis, and enough others to carry complete conviction that plethoric obesity is very dangerous as well as very uncomfortable.

If anything, the anemic type is worse and perhaps more dangerous, but does not attain the extent of mass of the plethoric type; that is, the fatty deposits are not so pronounced. More frequently women come into this classification. Complications are usual and there is absent both the appearance and reality of health. A victim of simple plethoric obesity may wheeze on for years, but an anemic would better hasten on her way for a careful diagnosis and skilful treatment.

The prognosis for the obese varies. For the plethoric type, if there are no complications, the outlook is good under appropriate treatment. If the obesity is pronounced and complicated by arteriosclerosis, the outlook is grave. For the anemic type the prognosis is rather dubious. Even if the

anemia yields to treatment there is always likelihood of relapse.

In a disease or condition which involves so many complications, has so many bearings and is so various and so common, it is natural to expect many remedies, treatments and cures. It may also be expected that tradition, superstition and quackery, will express themselves often and with emphasis. In this respect probably the most vivid complication is esthetic. Obesity is neither beautiful nor does it contain the hope of beauty. Men may be less concerned about this than women, but they are concerned. The first impelling force to slenderness is not health. The desire for slenderness is by no means confined to those who are already fat, and those who are already fat may not have so ambitious a goal. However, efforts to control or regulate weight are confined to no class or age. Gout, often an accompaniment of obesity, is not a mark of wealth or luxury. Obesity is no respector of persons or states, but there are many who accept it as

inevitable and natural, whereas it is neither, and do nothing to prevent or control it. Others fight it sooner or later, often because they object to the appearance it brings or the discomforts or because it impairs their health or impedes their activity.

A fat person is not only the prey of his own whims and fancies; he, and more particularly she, is the target for a vast variety of suggestions, remedies, treatments, preparations, diets and exercises. They come from both friends and enemies, from physicians and laymen, from newspapers and magazines. A film celebrity develops a diet by which she can starve herself into the retention of her job, and it is forthwith dangled before the hopelessly hopeful eyes of a million women who are fussed about their tendency to grow larger. Madame Petrovsky, famous danseuse, keeps her hips down and her chest up by certain bending and stretching exercises—illustrated in four colors

with press agent obbligato—and ten thousand ambitious and normal young women begin to bend before breakfast and stretch before bedtime. But only healthy persons can starve and bend and stretch and roll. There are myriads who can't or won't and so we get machines that will do it to them or for them. Exercise becomes relatively passive and the manufacturers, retailers and advertising media gather in the profits.

Passive exercise, however, is not enough. There is a step beyond that, still easier and cheaper. It comes in the form of bath salts—results positive and speedy—or internal medication—simple and certain, harmlessness guaranteed or money refunded—and all extensively advertised and publicized. Practising physicians are pestered with questions about these cures, remedies, treatments and apparatuses. Often enough they are bluntly asked if they can produce such results by other means or any means. They try to make good on what the quacks and the ballyhoo performers

promise and buttress it with more solemnity and magic by preceding the prescription with a blood count, a blood-pressure measurement, and a catharsis.

The competition for the patronage of those who would be thin and slender and graceful is broad and keen. The numerous obstacles in the path to success are ignored. Appetite and normal tendencies are put aside. The measurements of the Venus of Milo are cited in vain. Venus today would have to bend and stretch and roll, or be out of style. She has a jellied look and as a silhouette she is a washout.

When normal women are bent on making themselves abnormal by banting and exercise, one can only imagine the strain that is put on the obese. It took a physician three years to gain substantive evidence that women who weigh over 160 pounds attain a married state only by economic pressure, that is, if they are fat, they must also be rich. Of 690 women whose individual weight exceeded

180 pounds, there were only seven who weighed as much as 150 pounds when they were married. The average weight at the time of marriage was 123 pounds. The doctor spent three years to learn what every woman knew before he began.

Style or fashion is, however, only a single motivating force that drives over-weighty persons to diet, exercise and other treatments. It drives, probably, with greater power on women, but men are by no means immune. The reasons are plentiful and cogent.

The obese person—a fat man or a fat woman—is out of adjustment with his surroundings. His efforts to bring himself into adjustment drive him to diet, to exercise, to cures, to treatments. His purpose is to attain the maximum of health with the minimum of danger and inconvenience, so that he may better fit into an environment where his size and weight will not be a handicap. He has an earnest desire not to be conspicuous, a natural desire to be adaptable and happily adapted.

A child, three feet high, is under a similar handicap. He runs around among furnishings that were designed to fit the average adult person. He has to climb up on a chair. He learns what a table is from looking up at it. Ordinary things are out of his reach. The general condition is remedied to some extent by providing furniture made to his size. There will be some of it in the home and more of it in the school. But the child takes little notice. He is growing. He can, at least, look forward to the time when he will fit into his surroundings. In the meantime he receives assistance. He is lifted on and off high places. He is carried over distances. He finds corners into which he will fit. He is not resentful and he has hope. He is daily coming nearer the point of adjustment.

A fat person is at the other extreme. Like the child he moves about among furnishings that were designed for the average. He looks askance at chairs and seeks a sofa or davenport. He abhors public conveyances and the seating accommoda-

tions in halls and theaters. He blocks aisles and passageways. Sneering and vulgarily humorous remarks fall on his ears which grow continuously more sensitive no matter what efforts are made to appear indifferent. He receives neither assistance nor sympathy. He, and she, attract not only attention but comment. The ordinary run of people are not slow to display their wit and the obese are regarded as legitimate targets. One of them, a woman who acknowledged 240 pounds, has made a collection of the jibes that have come her way. She laughs about them. Laughter, she says, is the only palliative for the humiliation. She has heard herself described as "perfectly disgusting," as a "freak off duty," as a "frightful example—you can see what you are coming to." She has heard one child ask, "Say, Mama, is that all one lady?" She has ignored the queries, "Say, sister, how about a date with the standing army?" and "You're pretty hard to get around, ain't you, kid?" She has heard: "How about feedin' peanuts to her!" "When does



THE PRICE OF MOTHERHOOD

Four cycles in the life of a woman who thinks the price she paid was not too high but still wonders why. Mumps does not distinguish between the sexes.

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CONSUELA

Her smile belies her grief. Like Mr. Finney's turnip, she grew and she grew and, like a true fat lady, she became a side show favorite. Consuela was a syndrome.

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the balloon go up?" and "I'll bet her husband doesn't have to shake the sheets to find her," and, "With those hips, kid, you are sitting pretty."

The list is long and still growing but the unhappy victim thinks such vulgarisms less annoying than the serious advice she receives from friends. In its usual form it is that "you ought to do something about it," or "if it was me, I'd saw wood, you know, or something like that."

She may laugh at the jibes but the advice makes her sympathize with those who give it; they are so blandly ignorant.

Gradually she is becoming detached. She avoids crowds and public places. She knows that eventually she will be isolated. Her physical handicap is producing an emotional condition that may best be described as a social maladjustment. But with it she has developed a philosophy that is fair insurance against grief or regret. She says it is worse to be dumb than fat.

Another woman has this story to tell:

"I have lived," she writes, "a normal life, as I understand normality, since childhood. And yet, from a fairly symmetrical, good-looking girl and an average young woman I have grown into a mountain of flesh—a monstrous mountain of flesh. I admit it because I can't avoid seeing myself reflected in mirrors although I try not to. I am a little past forty now, in what I think are the best years of my life. I relinquished all social activities long ago. I live for my children and my home. Please don't misunderstand me. I am not discontented or resentful, but there is something within me that clamors for an answer to this riddle. This unexpected and unwelcome obesity is a riddle to me.

"Perhaps, if you will scan the pages of my history, as I have done so often, you can solve it for me.

"I have a vivid recollection of being the tomboy of our neighborhood when I was young. I shared with my brother, two years

my senior, in every rough and tumble game. I ate varied, wholesome food and I was well and active. My mother assures me that, aside from teething troubles and a colic from eating green apples, I had no early childhood diseases. In school I was an average pupil. I passed my examinations and learned my lessons without particular difficulty. The only serious ailment—if it can be called serious—was an attack of mumps when I was eleven. I remember how my playmates teased me when they saw my swollen face through the window and how I fretted over being kept indoors. Once or twice I evaded my mother's watchful eye and stole out. I considered myself abused because I was treated like a baby for such a trifling illness. I mention this particularly because it is the only time I was ever sick. My convalescence was unimportant. In the retrospect it seems as if the mumps just disappeared. Yet a faint but insistent recollection haunts me that thereafter I was changed. The urge for rather rough games had left me. A kind of lassitude I had not before known op-

pressed me. I seemed to have become faint-hearted and timid.

"This change seemed rather to please my mother. She attributed it to my 'growing-up' and said it was natural that I should act like a young lady. But I have often wondered if my later difficulties were not of this origin. Merely 'growing-up' never seemed to me to account satisfactorily for my change of conduct.

"It is, perhaps, necessary to mention here the morbid curiosity I felt when I heard girls younger than myself—I was now fourteen—talk about menstruation. I also remember that mother, when I went to her for information, proffered vague answers. I must have been nearly sixteen when I first had that experience. It was painful but short. I came soon to dread the monthly recurrence of this plague, as I called it. Familiarity did little to decrease the dread.

"You can see from the photograph I enclose that I appeared to be a perfectly normal girl. To be frank, however, I never experi-

enced the little thrills that my girl friends seemed to have when exchanging confidences about their beaux. I was never beset by the temptations my friends experienced. I went my way calmly and, in time, as a matter of course, I married. My husband is twenty years my senior but I have never considered or regretted the discrepancy in age.

"The first indication that I was destined to become obese, came after the birth of my first child. After my convalescence I gained forty pounds in a few months. This first child lived but a short time.

"The two girls you see in my last picture came within two years when I was entering the thirties. With them came increasing weight until I am as you see me.

"I must repeat: I am not complaining. I am content. If my children came at the sacrifice of personal appearance, I am willing that it should be so. My husband is most considerate and I respect and honor him.

"But why did I change like this?"

A graphic recital of a usual case. The writer connects her obesity with the one illness in her career—mumps—and a consequent disturbance of the sex-mechanism. Obesity is frequently the penalty of such derangement. It comes in its most exaggerated form after repeated pregnancies following menstrual irregularities but it occurs rarely when such irregularities are absent. The self-diagnosis was correct in this case. It is a complete answer to the final pathetic question. However, it is not very satisfactory to know the cause unless the remedy is also forthcoming.

And now we come to the case of Carry, who was later known as Consuela, and was distinguished for her mass—640 pounds of it, and sometimes more. She comes as example and demonstration of a glandular syndrome and its consequences when they take the extreme form of obesity. Consuela was a din. The orchestra was active, des-

perate and out of tune and rhythm. The metabolic processes were on a spree. The early history is illuminating. It was supplied by her aunt, an elderly spinster, as lean as her niece was fat.

Consuela's mother died in giving life to her daughter, who became a troublesome charge to the aunt. Consuela was a sickly, puny baby. Her first two years brought a succession of infectious ailments from which she made normal recovery. There followed four unimportant years but when she was six and ready to go to school, there came an attack of scarlet fever. Her convalescence was slow and complete recovery belated. She ailed for more than a year, seldom leaving the house. She was nearly eight when the doctor finally allowed her to enter school. It was at this time that she began to take on weight.

When she spoke of those early days in school, Consuela's cheeks would flush with anger and her eyes would flash. She never forgot the humiliation which overwhelmed her when she first heard her-

self called "Fatty." But the appellation stuck to her, of course, and became more deserved as she continued to grow.

When she entered high school, she had become so enormous that a special seat was provided for her. She was a never-ending source of curiosity and amusement to her schoolmates, but the teachers urged her to seek medical aid.

Consuela's father had long before disappeared and her elder brother had struck out for himself. The aunt, with whom she lived, made a meager living for them both, "working out by the day." Consuela, therefore, went for medical advice to a free clinic. She saw a physician who specialized in obesity. He became interested and immediately prescribed a strict diet, giving no heed to the girl's statements that she had always eaten sparingly and could not have done otherwise if she had desired it. She disbelieved his opinion that food, as such, was the cause of her abnormality, but she followed strictly the doctor's orders for the first year. She

ate exactly what he prescribed and nothing else. She kept watch and weighed herself every day. She observed that her weight increased steadily at the rate of five pounds a month, not gradually but during three or four specified days. In the year she gained sixty pounds.

At the year's end a new heartache was added to her already large collection. The physician who had prescribed the diet presented her before a group of medical men and delivered an address with her as the subject. He scathingly denounced her as a typical example of the untrustworthiness of the obese. He described her condition when she first came to him and the diet he had prescribed. He emphatically declared that she had not followed instructions and that her increased weight was due to her gluttony. Under such circumstances, he said, improvement was impossible and angrily pronounced her as ungrateful and incurable because she refused to be cured. The girl was overwhelmed with shame and confusion. She could make no an-

swer to the accusations, but her confidence in medical care was destroyed; she never consulted a physician again.

With hope gone and increase in weight continuing, she left school and remained at home. At sixteen she weighed more than 500 pounds. She was traveling the regular route of the obese, through grief, sensitiveness and despair, to isolation. But Consuela's road was especially hard, perhaps, in proportion to her exaggerated size. She was poor. She was of little help to her hard-working aunt. And she kept on gaining. She feared she would never be able to leave the house unless a wall were removed. Clothes were a problem of increasing difficulty. She could wear nothing the stores provided. She was clumsy with her hands and sewed poorly and with difficulty. As best she could she fashioned garments for herself, unbecoming, of course, uncomfortable and decidedly baggy. But her isolation was not complete. She could not hide from prying eyes; when people

came to see her, they saw her. Like Cæsar, they came and saw and, in one instance, there was an eventuation.

Now and then Consuela's aunt would be able to rent a room to transient guests. On such occasions Consuela concealed her dismay and bore the inspection. One pair of guests were from a circus. The mountainous lady interested them professionally. They spoke to her about it. An offer followed and was accepted. Consuela's obesity, heretofore a handicap and a humiliation, became at once an asset, a means to a modest living. She became a side-show attraction, with what passed for her figure emblazoned on a broad banner outside and a glib and checkered gentleman to explain to the awed onlookers who she was and why. Professional posing was different, Consuela discovered. Her shyness vanished. She became hardened to cruel remarks. Good nature was profitable, and witty rejoinders to vulgar jests increased her value to her employers and to herself. She sold her photo-

graphs and the better saleswoman she became, the larger the profits. And her hard-working and loyal aunt, in due course, became the wardrobe mistress of the side show. Consuela, of course, never married. Her attractions were many but not of the kind that lead to matrimony. But it is also true that Consuela was not attracted. Sometimes a glandular syndrome provides a dual protection.

The giant, the fat lady and the dwarf face common difficulties in adjusting their physical freakishness to average surroundings. Like the three-year-old child they do not fit. If their mental balance is normal the difficulties are increased by the emotional revulsions and upheavals that contact with average people inevitably produces. The whispered allusions to them may be good-natured or witty but in time they pall and become worn. It is rather unusual for even a marvelous wag to say something of or to a fat woman that she has not heard before. A wag is a wit only a few minutes of the day but a fat woman is fat during the

whole twenty-four hours. So, like Pietro and Consuela, they become sensitive, shy and reticent. In these two cases the interest is the greater because, in the end, they capitalized their handicaps; but Mustapha was in another class. His emotional equipment was atrophied. He was egocentric and fortunately indifferent. To condole with him would be a waste of sympathy but pity for her would make Consuela weep. Pietro receives more admiration than sympathy, but it is always the dubious admiration of surprise and curiosity. Every tall man is glad he is tall and every short man grieves a little for himself unless, like Mustapha, he is egocentric.

The philosophies developed by those emotionally unfortunate and undulled, naturally vary with the individuals and the circumstances. They have a common meeting ground only when each individual's problem is solved. Pietro is happy in his work at the water-front mission. Consuela is pleased that she has found a niche and is self-

supporting. Mustapha was always satisfied to have enough to eat and to avoid physical discomfort. In every case circumstances dictated the selection of the occupations into which they fell. The three, however, suggest the troubles of the many whose departure from normal is less pronounced—the thousands who are not misfits but are partially unfitted. There are not only glandular derangements and variations but the results are registered by degrees. Recommendations to sympathy are, however, not so refined. The best way to sympathize with a fat person or a tall person or a short person is to avoid mention or observation of it.

Mary Ella is authority for that statement and Mary Ella was socially and in other respects far removed from Consuela. Mary Ella was only fat. Her glandular perversions limited their eccentricities to that single visible manifestation. Mary Ella was one of a normal, prosperous family. Her father was a successful merchant, her mother a comfortable, home-loving woman and her five

brothers and sisters typical products of a good home, good training and good surroundings.

Mary Ella, however, was in trouble from the very beginning. Petty ailments alternated with more serious illnesses when she was a baby and later on interfered with her attendance at school. Her fight against her troubles began at that time. She had a normal ambition to learn and, despite the interruptions, she progressed in her studies. When her illnesses ceased she began to take on weight. When she was eight she was fat and from that age on she was fatter. It was a matter of greater humiliation to her brothers and sisters in the beginning than it was to her. She was socially undesirable and evidence of it was brought home to her frequently. She was left at home when the others went out. Invitations came to the others but not to her. She was Cinderella in effect but not in fact. In due course she came inevitably to the conclusion that she was unsought because she was a freak. It was a matter of fireside discussion and it

touched the raw side of her sensibilities, but she herself never took part in the discussions. However great the shock, she concealed it. She did her weeping in solitude and maintained her natural cheerfulness before others. Her parents and brothers and sisters were kind and sympathetic. They never wounded her feelings intentionally. They were, indeed, greatly concerned for her. But the more they emphasized their concern, the more Mary Ella suffered. Nothing the physicians—and there were many of them in the course of years—could do checked her growing obesity. Her one comfort came from her understanding mind.

In Mary Ella's glandular orchestra there was one instrument that played more harshly than the others and all were to some degree out of tune and tempo. The evidence of this clamorous demand for dominance come in the form of insufferable headaches which began when Mary Ella was nearing her fifteenth birthday. The family physician was puzzled over this new display of eccentricity.

He studied and pondered and finally carried her off to a physician who had recently written an article on pituitary headache. Investigation disclosed that Mary Ella's pituitary gland was the one that was screeching for attention among the orchestral performers. Treatment soon quieted it, but it did not stay the part that apparatus was playing in adding to what Mary Ella rather bitterly termed her "displacement."

When she was sixteen and weighed nearly three hundred pounds, Mary Ella declined to go to school, but she kept abreast of her sister by studying at home. Her father and mother thought they understood her decision. There were family councils in which Mary Ella was always outvoted but, nevertheless, the minority ruled. She knew the others did not and could not understand. Like Pietro, she was determined, but, unlike Pietro, she was of fine fiber, much more sensitive and with more capacity to suffer.

With the ending of her school attendance she

became more and more of a recluse. She saw only the members of her family. She devised methods of exercise but with no idea of reducing or beautification. They were health exercises. Mary Ella feared she might not only become inactive but lose the power of action. Obesity always brings with it the fear that locomotion, which becomes more difficult with the passing years, will eventually become impossible. The growing weight will become too much for the legs to carry. Lack of activity weakens the leg muscles and weakened leg muscles protest against more work. Mary Ella not only feared it but felt it. So she set a régime for herself and stuck to it. She was not deluded as to her appearance when she walked and was quite aware of how she looked when she rolled. She did both but always indoors.

Mary Ella passed her twenty-first birthday and the one-fifth of a ton mark at the same time. Then came a series of happenings which overturned her entire scheme of living and brought her new prob-

lems. Her two brothers died on a battlefield in Flanders. Her sisters married. Two years later an automobile accident took both her parents and her remaining sister. Mary Ella, the recluse, fended from loneliness by seven persons, found herself alone in a world of which she had had no experience; she knew only that it was a world in which she did not fit. She weighed more than 450 pounds.

It had never occurred to this sadly and badly handicapped woman that some day she might have to earn her own living. She was by no means destitute but her inheritance was not large enough to maintain her indefinitely. The home and the environment to which she had adjusted herself was too large for her and too expensive. What could a fat woman do? Where was there a place into which she could fit her bulk and perform gainful services?

It was a question which would baffle a person of average size. Mary Ella pondered it long and prayerfully. She had no counsel, but it helped that

she had solved other problems not less puzzling but, perhaps, less vital. She received a few suggestions and one that struck her fancy. She investigated. She considered. She acted. She bought a fox farm.

The decision seems as strange as the woman who made it. Family friends tried to deter her from going into the country to conduct this enterprise in person. But Mary Ella was determined. Her friends predicted failure. Offhand almost anyone would say that such a business under such a management was foredoomed. But the fox farm was a success from the start—a double success, Mary Ella called it. It not only produced satisfactory results financially, but it gave its owner an occupation. It made her active. It claimed her interest and held it. She found in the care of her furry charges the consolation which many find in the companionship of cats or dogs. There is, in fact, much consolation because there are many foxes and a great deal of Mary Ella. She rejoices that this occupation

freed her from the obnoxious need of petticoats and the equally obnoxious association with staring and critical persons. She dresses like a man. She has two male employes. She can walk in the open. She can—and does—roll on a hillside which is sheltered by trees and bushes on all sides. No one ever sees Mary Ella roll. She doesn't confess it very often. She has foxes. She has books. She has contact with the world by radio. She has her own society on which she still depends but now also she has a few friends who understand.

There is a lesson of courage and determination in Mary Ella's story. Perhaps the source of the courage and determination is in the pituitary gland whence came the headaches and the clashing dissonances of the orchestra.

CHAPTER VIII

ADRENALS

NO ORGANS of the endocrine system have caused the physiologists so much worry as the adrenals. It is recited that as long ago as 1716 the Academy of Sciences of Bordeaux suggested as a subject for competitive treatises: "What is the Use of the Suprarenal Glands?" The treatises were apparently more noted for speculative ingenuity than for information.

It was 150 years later that Thomas Addison, an English physician, gave the first clue to the functions of the adrenals in a description of the disease that was named for him. Addison's disease, as he described it,

> "is characterized by anemia, general languor and debility, remarkable feebleness of the

heart's action, irritability of the stomach and a peculiar change of color of the skin occurring in connection with a diseased condition of the suprarenal capsules. . . . This singular dingy or dark coloration usually increases with the advance of the disease . . . the pulse becomes smaller and weaker, and without any special complaint of pain or uneasiness the patient at length gradually sinks and expires."

Addison showed that the destruction of the adrenals is commonly caused by local tuberculosis, but other disease processes, cancer, for instance, may bring about the same fatal result.

Addison's discovery, demonstrative of the manner in which disease has opened the way for knowledge of glandular functions, instigated a long series of studies and investigations which were marked by many failures, many controversies and steady progress. The experimental studies had as a first practical result the isolating of the substance in the adrenal extracts, which was named

epinephrine. From this was obtained the hormone itself which one of the investigators named adrenalin. This is now in common use the world over. It may be produced synthetically but the common source of it is from beef cattle slaughtered in Chicago.

Adrenalin is the hormone of the medulla of the adrenal gland. Its administration has exactly the same effects throughout the body as the stimulation of the sympathetic nervous system which controls many involuntary vital activities. A few years later this stimulation was interpreted as the emergency function of the hormone—that is, in time of stress or danger, a discharge of adrenalin into the bloodstream, thereby increasing heart action, supplying more fuel and oxygen to the muscles, and accelerating the disposition of wastes. The waste is replenished by release of sugar (glycogen) stored in the liver, which is carried to the muscles by the increased blood supply which also stimulates the directing nervous system. The

entire animal is made ready for unusual activity—for the support of the condition of anger—fight, or that of fear—flight, or whatever behavior best serves to meet the emergency.

With this demonstration of direct correlation between an emotional state and adrenal gland activity there came naturally an exaggeration of consequences. It is, however, recognized as a physiologic fact and it becomes immaterial whether the hormone acts merely to reinforce the sympathetic nervous system or has an independent action of its own. Anger and fear are emotions and they act to increase the production of a hormone to which the functional reaction is the preparation of the body for extra exertion of power. Adrenalin, as noted, is a hormone of the medulla. The medulla, while completely surrounded by the cortex, is nevertheless dispensable. Its extirpation in experimental animals has been successfully accomplished without fatal results, but the removal of the cortex is always followed by death. The hormone of the

cortex, indispensable to physical well-being, was produced in 1929, and named cortin. Its efficiency has been demonstrated in laboratory animals and in cases of Addison's disease. Treatment in these cases has been successful but the available supply of cortin is limited and its cost all but prohibitive.

The adrenals are subject to or the causes of other ailments, but these are not pertinent to the present discussion. All are characterized by disturbances of metabolism, that is, the basal metabolic rate is depressed, especially sugar metabolism. There is a low level of blood sugar, the reserve of glycogen in the liver and the muscles is decreased. In addition blood pressure is low, kidney action is affected and patients are always underweight. Serious adrenal disturbance brings thyroid, pituitary and gonad complications—a syndrome of symptoms. Of the influences of the adrenal glands on sexual development there is no doubt and their

derangement brings about sex disintegration or perversions which go far to distort natural growth. There are cases in which babies have come to puberty in a year, reached maturity at three and died as venerable old men at seven, thus having passed through all the cycles of life. Adrenal derangements give females certain masculine traits and characteristics; they cause organic sex abnormalities, and make bearded women. So far-reaching and puzzling are the effects of adrenal deficiency that, without the direct evidence of correlation between an emotional disturbance and a physical-glandular reaction, it would be legitimate to infer a psychic relationship, or influence on behavior without recourse to syndromic complications. The added relationship with the sympathetic nervous system seems to broaden the possibilities.

Embryologically the adrenals arise in close association with the sex glands. Functionally the two glandular organisms are closely associated through-

out life. The adrenals play an important part in the prenatal state. They develop rapidly. In the third month of fetal life they are the most conspicuous structures in the body cavity. They continue to be relatively large at birth but thereafter they diminish in size. Their importance is emphasized by their blood supply; six times their own weight in blood passes through them each minute.

There are men devoted to scientific research who see in the adrenal glands the dominating members of the endocrine system, and in the system they see the key to the mysteries of life. Scientific speculation, however, always runs ahead of scientific demonstration. It seems at least theoretically incontrovertible that the endocrine influences pass beyond mere physiologic functioning; important as that is, it is, in many respects, overshadowed by possible and even probable explanation of the springs of personality, of the multitudinous vari-

ations in dispositional traits, of the causes which drive men on and hold them back. The most skeptical of investigators will often pause in their reports of cold physiological facts to invade a tempting psychic field which lies too near to be completely ignored. The less critical will not forego the temptation but will plunge on into the unknown until the factual basis is completely exhausted and they are forced to return for new material. The scientific mind is the curious mind, insatiable in its search for truth, but it has turned itself in no direction where there is the chance of learning anything so charged with interest as the relation between body and mind—between the instinctive urges and action and rational behavior.

Probably the generative glands—the gonads—through their internal secretions, spur the nervous system, heighten the tonus of the muscles and the motive power which comes also to expression in a spiritual sense and in high creative activities, but back of these glands are the adrenals whose regu-

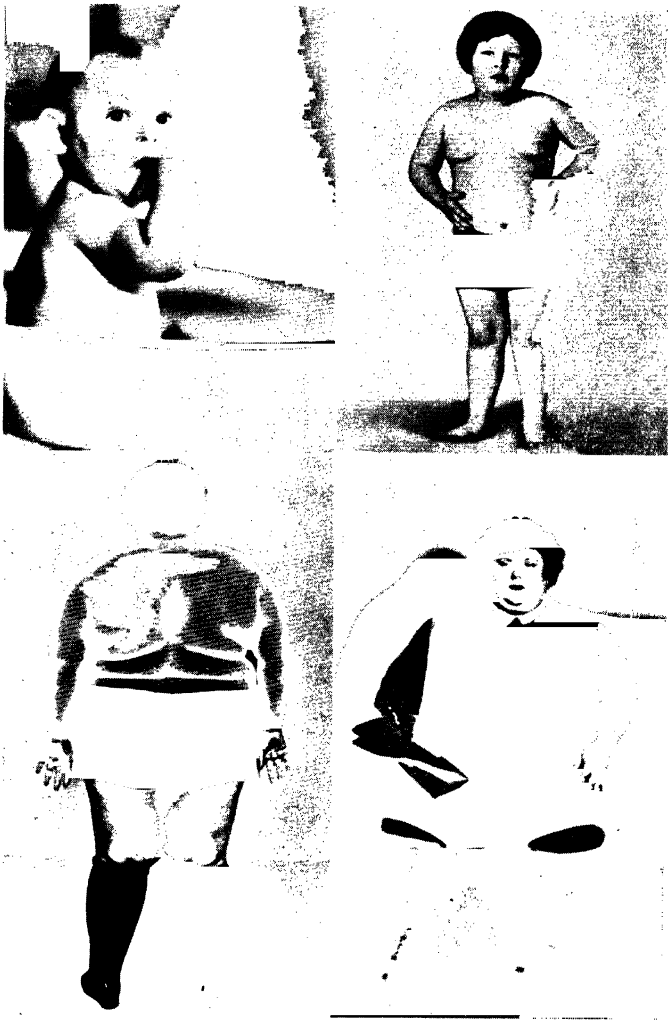
latory powers seem to excel all others in the endocrine system. They have, of course, a place in every syndrome. They have particular relations with individual endocrines and general relations with them all. Their secretions affect liver and kidneys, heart and stomach and intestines, and, most of all, they control the quality and content of the blood and, therefore, the entire bodily organism. It has been noted by physiologists that in the singular condition known as anencephaly, in which a child is born without either brain or adrenals, there is doubt as to which is cause and which effect. It may be neither but in point of embryonic growth the adrenals seem to come first, although that may prove nothing at all. But it is an interesting if not significant coincidence. However, we are on firmer ground in believing that when the adrenals are out of tune the entire orchestra is in a bad way.

As pathology opened the way to endocrinology, so Addison and the disease named for him opened the way for the momentous discoveries that have

trailed one another through the last seventy-five years. The practising physician is more interested in sick glands than in well ones, because he knows the importance of clinical observation and experience. It is through study of the abnormal that we learn about the normal, as previously stated. Addison's disease is described as "an acute or chronic, more or less complete, loss of function of the suprarenal apparatus."

It is believed that those who develop Addison's disease have had defective adrenals for a long time before the usual clinical manifestations appear. Thus it is apparent that the influence on their conduct may be felt long before it becomes possible to diagnose their trouble. In such cases other glands are involved and we have a syndrome of difficulties as well as of symptoms.

Addison's disease when not quickly fatal, is the cause of or is accompanied by aberrations in conduct which are not infrequently criminal in nature. Criminal or violent behavior is very likely to be the



OBESITY

A 500-pound and still growing woman who, when need came, found the isolation she desired, and profitable occupation by buying a farm



SICK MAN OR CRIMINAL?

A submarine commander's tragic course from honor and efficiency to death in a West Indian prison. A case of Addison's Disease—infection of the adrenal glands.

[See page 307]

accompaniment of a glandular ailment rather than a manifestation of it. There is nothing in physical illness or disease to cause vicious conduct. But when the disease results in emotional derangement, lowers the vitality, upsets moral equilibrium and dulls the sensibilities, vicious conduct would seem a normal outcome of abnormality.

Criminal conduct is the product of such a variety of forces that we must hesitate to make a general or even particular ascription of the causation to a particular disease. In this will be found complete criticism of the procedure in which what is termed insanity is held to be proof of irresponsibility for a criminal act. The joker, of course, lies in the definition of insanity and is further complicated by the difficulty in determining the degree of it by the processes ordinarily used. However that may be, the investigator will halt a little before he attributes a crime or criminal conduct to gland de-

rangements. He will wish to gather other information which includes the training, environment, associations and so on of the individual under suspicion. However, it may be said with assurance that emotional imbalance, which results from glandular disturbance, often fits the person afflicted for the commission of a crime or for a criminal career. The high-minded, rational criminals who ply their trade for others' benefit or who are impelled by altruistic or socialistic desire to right a wrong or secure a redistribution of wealth, exist only in legends and novels. Crime, like disease, is sordid and repellent. It is attractive only to misfits and romantic only to insolvent minds or the emotionally sterile.

Addison's disease is fortunately rare or, at least, infrequently detected. Our records contain the history of one who was a naval officer. At the time his behavior first attracted attention he was in com-

mand of a submarine—a gallant and competent officer by testimony of a dozen members of the ship's crew. He was described as kind, just, humorous and, best of all, a genial comrade. He was proud of his calling, his ship and his men, and the latter he trained to the point of efficiency, recognized and complimented by his superior officers. The commander led them all in physical power and athletic prowess. When it was possible, he swam around the ship every day and, when the sea was rough, alone. Several of the crew recalled that on an occasion when an epidemic sent half the crew to their bunks, he went sleepless for forty-eight hours to nurse the sick.

The members of the crew were reluctant to speak of the change that came over their commander and the circumstances that attended it. He became irritable. This they attributed to the headaches of which he spoke occasionally, and the sleepnessness which they observed but could not account for. He seemed moody and depressed. He

decreased his physical activities to a notable extent. He seemed unable to remember orders which he himself had issued. He sometimes upbraided his men for doing the very things he had directed them to do. At first irritable, he soon became irascible. One day in an unprovoked outburst of temper, he knocked a man into unconsciousness. The ship was in port at the time. Soon after the commander went ashore. The crew never saw him again. His conduct was completely at variance with his record. Investigation followed. The sum of the information obtained was that he had gone to a bank, withdrawn the balance of funds to his credit and removed the contents of his safe deposit box. No other trace of him was found.

About five years later, one of the writers of this book, on a tour of the West Indies, had occasion to visit one of the native prisons. The conditions might well be called appalling. He made visits to prisons in other places to find that they were all alike—filthy, insanitary and all filled with men

who were flogged for the slightest infraction of the rigid rules.

On one of the islands he met a prison warden who was willing to discuss conditions and impart information. The prying physician was shown the usually forbidden cells of the incorrigibles. These were hewn out of solid rock and were both dark and damp. In one of them he saw an American whom the warden described as a thoroughly "bad hombre." The man was in solitary confinement as part of his punishment for assaulting and nearly killing a guard.

The prisoner was stubborn and refused to answer questions. His appearance, however, aroused the physician's professional interest. He went nearer and found the prisoner's skin was as brown as an Indian's. The man was asked to open his mouth. When he did so the doctor saw the telltale spots on the membrane.

The warden, rather reluctantly, consented to the man's transfer to the prison infirmary. A more

thorough examination confirmed the physician's first suspicion that here was a case of Addison's disease.

The former submarine commander finally disclosed his identity but would not or could not give an account of his experiences. He was indifferent about his transfer to more comfortable quarters and was uninterested to learn that he was ill. The warden said the records showed a long list of crimes and that the prisoner had served two years of a ten-year term for murderous assault.

The warden's sympathies were aroused by the case and the physician departed with assurances that thereafter the prisoner would have proper care. Six months later the warden wrote to the physician that the unfortunate prisoner had died after the usual and final delirium and coma.

The story of the naval officer happens to be the second case in our collection in which there was a criminal complex. This is presumably due to the fact that search or chance has not led to the places

where such discoveries would be likely. This case, however, brings the suspicion that investigation might reveal many cases of similar import. There would be few, if any, of Addison's disease because of its rarity, but there would likely be others and they might also show astonishing variations from the physical records as they appear in penitentiaries and places of detention for defectives of criminal inclinations. The depressive state that arises from gland deficiencies is favorable, when social training and environmental conditions correspond, to drive the subjects to vicious conduct and, particularly, to acts of relentless cruelty. Glandular deficiency is not conducive to moral integrity. It often accompanies or contributes to the psychosis known as dementia præcox, which is itself known to be accompanied by sex deficiency. Gonad derangements, with their vast consequences in the field of morals, invite study in the field of criminality.

CHAPTER IX

PERSONALITY

A MAN is built up of unstable substances and is subjected to constantly changing surroundings. He becomes adaptable and stable through the action of his endocrine glands which work in coöperation with his sympathetic nervous system. The masses of cells of which he is composed are selected and placed and regulated by the hormones and he is adapted to his environment by the same regulatory system which reacts in response to the nerve impulses inspired by outside conditions. Each gland is a marvelous and delicate organism in itself but more marvelous and delicate in its balance and relationships with other glands and other bodily structures. There may be a considerable swing either way without disturbance or with-

out the machine's getting off balance. There is, therefore, as was said in the opening, a range within the zone of normality and a range without it—to sub- and super-normal. Any dysfunction of a gland may cause a rise or fall from normality and thus we may account for the entire scope of the variations in personality. It seems also to be true that the incidents, resulting from endocrine functioning and resultant human conduct, might be measured throughout history.

If there were adequate data, study of the great characters of history, with relation to their endocrine equipment and glandular urges, would be most fascinating. All of them had endocrines whose normal functioning and balance or whose derangements and distortions produced physical and psychical aptitudes and ineptitudes just as they have with the members of the gallery in this book. In our illustrations we have been fortunately freed from guessing. We have been able to relate

eccentric behavior to eccentric glandular conditions. It has been possible and practicable to compare derangements of a physical nature with aberrations of conduct, to study progressive changes and come to definite conclusions. It has been possible also to infer that minor aberrations have their origin in the same source and from the same causes and thus to set up as a postulate that glands, normal as well as abnormal, determine dispositional traits and so fix what is usually called personality. You are, therefore, what your glands make you. This is not to say that you have no rule whatever over yourself or your behavior. You undoubtedly have. You are subject to the influences of your associations, your environment and other external things. You may voluntarily interpose inhibitions and directions but so, too, you can "hold your breath," deny yourself food and drink and sleep, but all within limits. Naturally you are not conscious of the influences of your

glands and their hormones on you. Your glands are *you.*

The heroes and heroines in our gallery have been under psychological study and clinical observation simultaneously and for long periods, often to the end of their lives, often to post-mortem investigation beyond, and always to the climaxes of their emotional existence. Those who have been left in an indifferent state, like Mustapha, Clara B. and Louise, have no future, no promise of change except collapse, and no further emotional climax. Their glands are out of balance, their conduct corresponds, and there has been more than ample opportunity for the complete study of the various consequences.

It might seem to be true that, having a knowledge of the effects of hormone deficiencies in a large number of cases, we might infer a behavioristic result in other cases where there appears to be

an apparently similar physical disturbance. But it is quite out of the question to reverse the process; that is, we cannot work from a behavioristic basis to a glandular cause. In a diagnostic sense we may have a suspicion and seek to confirm it by every means possible. In a psychological sense, however, we encounter no such obstacles and we are at liberty not only to draw from conduct or aberrations a conclusion as to the causes but, in many cases, we may do so with much more than a fair prospect that they will be correct.

In this respect we will not be successful where historical characters are concerned. The impediment is to be found, not in the characters, but in our knowledge of them. History purports to tell of the achievements of men, nations and races. Probably it does. But it will tell us that Pompey and Alexander the Great were the victims of an overpowering ambition and not of a pituitary urge, coupled with opportunity to act on it. The historians and biographers have also been prone to

develop a philosophical interpretation of the information they have gathered or acquired until such characters as Julius Cæsar, for instance, or Charlemagne or Lorenzo di Medici, or even George Washington, emerge from treatment as fiction so far as their dispositions are concerned. We know something about Cæsar's political and military achievements—some of them told by himself—but the popular idea of Cæsar's qualities is as likely to have its source in Shakespeare's tragedy or Froude's Essay as in anything else. Ferrara, the Italian historian, has added the fruits of his research as the latest contribution to Cæsar without, however, giving assistance in determining that Cæsar had anything more than a disposition. It may have been a good or a bad disposition, or normal or abnormal. Whatever it was, it was of endocrine origin and under endocrine control. And that is all. Cæsar was blissfully ignorant of such things as hypophyses and so were most of his biographers. All of them were oblivious to

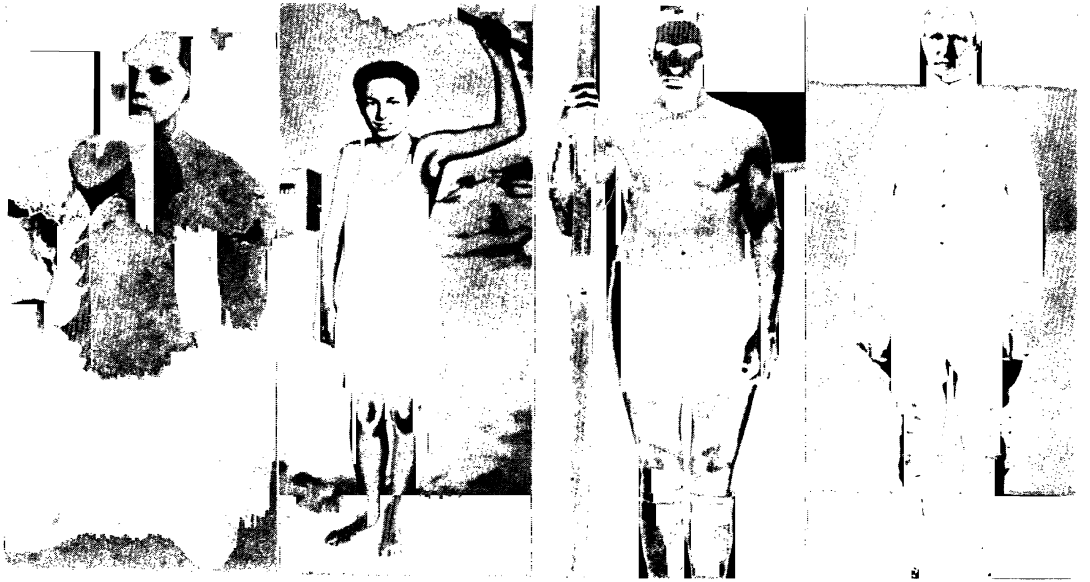
such a thing as a pituitary intrusion or influence on his conduct.

Similarly, it might be said that King Richard of the Lion Heart had a hard working pituitary gland which is a much better asset in a man of his adventurous spirit than a heart, leonine or other; or that Henry VIII had a copious supply of thyroxine, or that Napoleon, despite his stunted figure, was a victim of gigantism and a syndrome involvement. We might ascribe some glandular defect to Genghis Khan, as Harold Lamb has uncovered him, his remarkable cruelty, for example. But it is also true that what the Occidental regards as cruelty was much the order of the day in the Gobi, and Tartars, like most Orientals, were all cruel. Thus the trait of cruelty, not an unusual manifestation of glandular derangement, is left as a product of the place and the times, or a result of social conditioning or military custom or necessity. Further explanation and apology, however, would leave us unconvinced that Genghis Khan was not cruel. He is

credited with having destroyed sixteen million people.

These matters of speculative inference might be brought nearer to the present age. Many examples will suggest themselves with Abraham Lincoln, who is a favorite subject for endocrinological discussion, outstanding. It is, however, not very satisfying. We may say only that it is possible to be a little more charitable to Louis XI and a little more appreciative of Richelieu or Machiavelli, if we know that they might have been influenced by endocrine aberrations.

Endocrine science is too intensely modern for association with historical characters. The foundations of fact are too insecure and legend has interposed its license too freely. Conclusions or opinions as to the causes of behavior in such instances can satisfy nothing but fancy or prejudice. The handicaps are less pronounced when we turn



"SAMUEL P."

Soldier, officer, disciplinarian, martinet, student, author, failure—the victim of perverted glands of personality which made it impossible for him to understand human whims and sins and foibles.

[See page 325]

attention to the characters of fiction and their creators for glandular motives.

In this artificial world of men and women, and heroes and heroines born of imagination, there is an unending parade of glandular impulses and urges, inconsistencies and contradictions, explanations and revealments. Here we find respectable and respected citizen-authors describing and enjoying morbid conditions and unconventional situations. Here we find criminals bowed down under the weight of moral sanctions and convictions; we find motives which deny their source, virtue that is satisfied only when consorting with vice and vice that inevitably begets virtue.

Creating characters who automatically cancel themselves is doubtless a simple and harmless pastime. Why bother about it? One reason, probably unsound, is that our authors take meticulous pains and go to great lengths to psychologize and psycho-analyze their creatures with the purpose of

making them harmonize with themselves, with one another, and with all other characters in the same opus. The poor things are often compelled to undergo the direst of bodily and mental tortures that their creators may escape accusation of inadequacy or implausibility of motivation. Fortunately, however, maladjustments, legal, social, political, financial, marital, are the fruit which the novelist garners. Maladjustments breed all the conflicts and complications he needs.

Fundamentally material associated with sex or love is the most tempting because it is the most varied, the most human and, by unimpeachable popular testimony, the most interesting. Woman, by association, is of superlative interest, but as a function rather than a human being otherwise endowed. Pursuit, inducement, frustration and submission are terms descriptive of the elemental phases but the complexities are without limits. There is presumably no diminution of interest because one happens to be familiar with the formula.

The scenic settings come in kaleidoscopic variations. The personalities of the characters are at least as changeful as glandular relationships. Down the storied corridors of time they pass in an endless stream with Helen of Troy in the lead and Electra, Agamemnon, Ægisthus, Œdipus close on her heels; Hero and Leander, Troilus and Cressida, Romeo and Juliet and a compound of Rimini triangles follows—cycles and groups and hordes of them, unstaled by custom, unaged and unaging. We have wept with them in all their guises and disguises, smiled and cried over them, mourned their defeats and gloried in their victories. It is not even modern that we should be admitted to their bedrooms. Homer did that. But it is new, and a little disconcerting to old-fashioned minds, to find Aphrodite and her swain netted and exposed to the view in every yarn one reads. Realism is not content, like Homer, with a single episode. There are many. Details are supplied generously, with previews and reviews, with much about anticipatory

longings and more about the penalties of the aftermath.

Of such is the kingdom of popular modern story books, but the path of travel extends on and on with many windings. It is bestrewed with errant heroes and erring heroines—none of them particularly scrupulous but all of them persistent in what they call their search for happiness. And all fairly shrieking of glands.

The writer's field of choice, despite the breadth his own personality allows, is narrowed by the conventions and the public taste. Blood, love and money, according to a venerable city editor, are the generic words descriptive of human interests. All three of them connote conflict. All have their rise in normal or abnormal emotional disturbances. Who would write of them objectively will be a reporter; if he would write of them otherwise he must have behind him the experiences, partly real or partly imagined, which permit him to write

feelingly. If he is himself devoid of emotion, his characters will be colorless, flat and uninteresting.

In our gallery is Samuel P., an army officer. In active service he was known as an unfeeling tyrant, a martinet to whom an inconsequential departure from orders was a heinous offense and anything more was a breach that deserved severe punishment. Samuel P. never broke a rule or violated the letter of a regulation. It never occurred to him that he could be in any degree remiss. Every soldier, according to his standard, should do as he did—drill, work, exercise and study. Samuel, having a taste for literature, studied and read. He read diligently and widely and intelligently. He became appreciative, critical and familiar with the technique. He inherited a small fortune, resigned from the army and decided to devote his time to

writing novels. He knew that popular success came to those who wrote love stories. Impelled by a perverse urge that demanded compensation for a personal defect, he decided that he would write love stories. He did. He was under no restraint. He followed the approved formula. He utilized the recognized mechanics. In technique his product was faultless. He had three rejections from publishers in succession. When he reëxamined his copy, he could find no defects, or defects which to him seemed to justify the declinations of his manuscripts. He sought out one publisher and for the fifth or sixth time besought an explanation. The publisher admitted the writing was technically satisfactory, that the plot was well conceived and other things. "The trouble," he said, "is in your characters. Your characters are wooden. I imagine that the fault is in you. They don't seem to have any feelings. They talk of love but they don't love. They perform emotional acts but without emotion. They are living dead people. If you are

going on with your writing, you must learn something about life, about love, about sex."

Samuel took the rebuff calmly, like a good soldier. He was sure he understood and promised himself that he would profit by the advice just as he had profited from the experience of building three plots, developing three sets of characters—of writing three books. If sex was what the publishers wanted, he would give them sex.

It was a resolve usually more honored in the observance than in the breach, and Samuel's effort was not fruitless. He plunged into the unknown land which he had never explored before. He gave his imagination free rein. He pictured scenes of sexual revelry that made even his female contemporaries gasp with envy. His hero scoffed at chastity. His heroine had lovers by platoons. He took rare delight in breaking up homes, having fathers of families trade wives and placing innocents in positions that demonstrated sexual pre-

cocity as a natural trait that languished only when opportunity was wanting.

Imagination, Samuel told himself, was far superior to experience.

The book was rated as a sensation. It was widely reviewed and more widely commented on. It received attention from the pulpit. It was discussed in women's clubs. It narrowly escaped adaptation for the screen. Samuel was beset with offers for new writings and short stories. He was overwhelmed by his instant success. One persistent magazine editor demanded a first installment of his next book immediately. Samuel complained that he had not yet planned it; he had no plot. The editor answered that a new plot was not needed. The same one in a different setting, with changes of episode and incident, was all that was necessary. No particular pressure was to be put on Samuel's imagination ever again.

But Samuel never wrote the second book. The sensation that followed the first soon subsided. It

flamed and flared but burned itself out in a few weeks. The reading public discovered, if the publisher did not, that it was devoid of feeling, that the sentiment was mawkish, the characters artificial. It was made to a formula. It might have been said, but it was not, that Samuel's book did little more than testify to the quality of his personality and the deficiencies of his glandular make-up. It demonstrated nothing but the abnormality of his own emotional reactions.

> "The potency of the internal secretions," says a recent writer on the endocrines, "is almost unbelievable. Their influence is pervasive of all that we do or are. In the present they coöperate in determining the form of our bodies and the working of our minds. In the past they may have set the pattern of our advancement through the ages."

"It takes all kinds of people to make a world" is a trite saying. It suggests, however, that it takes

all kinds of glands, working in consonances and dissonances, to make all kinds of people. Of the glandular dissonances we know a little and of the consonances even less, because medical science is interested all but exclusively in the former—in physical discords rather than in psychical harmony. Possibly slight wanderings from the key of normality are inconsequential and striking departures from pitch will produce their own corrective processes, but it seems of importance as well as interest that everyone should understand in a general way the positions and functions of the endocrine glands and their hormones. They are the instruments that make the body an orderly organism, that regulate its development and keep it in balance. But the power of the glands extends beyond the physiologic make-up. Emotional balance trends closely to mental balance. The unfortunate persons whose emotions are topsy-turvy and seldom mentally well balanced are also likely to have the one-sided mental development which brings them an admired

and even admirable rating in the scale of intelligence and learning.

The creature of glands, who is not handicapped by disease, is almost uniformly proud of his equipment and talents. He is pleased that he is normal and equally pleased if he is so lop-sided that he excels in some department or particular. The violin genius is glad to be a genius. The champion pugilist is indifferent to acromegaly but proud to be the champion. The orator seeks opportunity to display his wares and thanks providence for the Fourth of July and holidays observed in honor of patriots and heroes. Presumably it is endocrine regulation and control that makes each one of us pleased to be as he is and what he is or, at least, deters us from wishing or caring to be like anybody else if it also involves a change in our own structure or disposition. The short man would merely like to be taller, the fat lady slimmer, or the graceless one graceful, but none of us would care to be essentially different. Ambition and envy

do not run so far. It is almost a divine dispensation that we are satisfied with ourselves, even if it involves sacrifices. To sacrifice even a small part of our essential make-up would be very disconcerting. It is idle to think of our endocrine system as a thing detached and apart. It is misleading to say, "I am what my glands make me." One must say, "I am my glands," or "My glands—that is I." The evidence has already gone beyond *"Cogito, ergo sum."*

Those who have glandular derangements, diseases and the consequences of them, are no differently situated. They are commonly, or not uncommonly, charged with deliberate complicity in their own misfortunes. Accurate interpretation of thoughtless or usual sentiment would show them to be obese by addiction to gluttony; half-wits by choice or misfits because they wish to be. They are victims, not free agents. Their eccentric behavior is sometimes, perhaps, within their control, but much oftener beyond it. Their conduct, it must

be admitted, challenges criticism but it is useless and idle to deride or blame them, however strong the temptation may be and, not infrequently, it is very strong.

Endocrine therapy is progressing with knowledge of functions and relationships, and surgery is keeping pace. But damage actually done cannot be corrected, although often disease may be stayed and defects supplemented in a material sense.

Prevention, however, is a new aspect of an old situation. It contains the promise of high efficiency and beneficent results. It is easier of application but the need for it may not be easy of detection. In many instances it could be applied as effectively by lay intelligence as by medical skill.

If the premises on which this thesis is built up are as sound as years of observation and clinical experience seem to indicate, endocrine derangements have their origin most frequently in the in-

fectious diseases of childhood—diseases, it is permissible to repeat, which are lightly considered, often ignored and often inadequately treated. The dread disease of them all is mumps and its complications. Mumps, with its destruction or impairment of the glands of personality, is a disease that challenges medical science to study and action. It demands that parents watch for its visitations and take extreme precautions against it. A terrible enemy—mumps.

GLOSSARY

Achondroplasia, defect in the formation of cartilage at the epiphyses of the long bones producing a form of dwarfism, sometimes seen in rickets.

Achondroplastic, pertaining to or affected with achondroplasia.

Acromegaly, a chronic disease, associated with over-function of the pituitary body, characterized by enlargement of the bones and soft parts of the hands, feet and face.

Addison's disease, a disease characterized by a bronze-like pigmentation of the skin, severe prostration, and progressive anemia, low blood-pressure, diarrhea, and digestive disturbance; it is due to disease (hypofunction) of the suprarenal capsules, and usually ends fatally.

Adiposity, the state of being fat.

Amorphous, having no definite form; shapeless.

Aneurism, a sac formed by the dilatation of the walls of an artery and filled with blood.

Arteriosclerosis, abnormal hardness and dryness of the arterial coats, resulting from chronic inflammation, especially at the intima; general thickening of the walls of the arteries.

Autonomic nervous system, one part of the unconscious nervous system; not under the control of the will.

Catalysis, a changing of the velocity of a reaction produced by the mere presence of a substance which does not itself enter into the reaction.

Catharsis, a cleansing or purgation.

Cerebral hemorrhage, a hemorrhage into the cerebrum or occurring within the cranium.

Cerebral hyperemia, an excess of blood in the cerebrum.

Clinician, an expert clinical physician and teacher.

Colloid, a state of matter in which a substance finely divided into particles larger than one molecule is suspended in another substance.

Contagious, any disease which can be directly communicated from the patient to those about him.

Cortex, the surface part of an organ. The outer part of the adrenal gland.

Cretinism, a chronic condition, congenital or developed before puberty, marked by arrested physical and mental development with dystrophy of the bones and soft parts. Cretinism is regarded as a form of myxedema and is probably due to deficient thyroid activity.

Cryptorchism, concealment of the testes within the abdomen.

Cyanosis, a bluish discoloration of the skin due to deficient oxidation of the blood.

Dementia præcox, adolescent insanity, a term used to include a large range of mental disorders which occur in early life and are marked by melancholia and self-absorption, terminating

in a characteristic mental weakness of an emotional nature.

Dysfunction, disordered functioning.

Dystrophy, defective or faulty nutrition.

Endocrine, applied to organs whose function is to secrete into the blood or lymph a substance which plays an important rôle in metabolism.

Endocrinology, the study of the internal secretions.

Epithelial, pertaining to or composed of epithelium.

Epithelium, the membranes which cover the surface of the body and line all ducts which open, even indirectly, on the surface of the body.

Exocrine, gland having a duct.

Exophthalmic goiter, a disease marked by an enlarged pulsating thyroid gland, marked acceleration of the pulse-rate, exophthalmos, a tendency to profuse sweats, nervous symptoms, including fine muscular tremors, psychic disturbance, emaciation, and increased basal metabolism. The disease is probably dependent on lesions of the sympathetic nerve, and is regarded as a manifestation of excessive or perverted thyroid activity.

Gestation, pregnancy.

Gonad, any essential or non-accessory sexual gland; an ovary or testis.

Homogeneous, of the same kind or of a uniform quality throughout.

Hormone, a chemical substance, usually elabo-

rated by a gland of internal secretion, which after absorption into the blood coördinates certain vegetative bodily functions. Examples are epinephrin, adrenalin, etc., the secretion of the adrenal glands, insulin, the internal secretion of the pancreas, and thyroxine, from the thyroid.

Hormonopoietic system, the endocrine organs linked together in a reciprocally dependent system.

Hyper-, a prefix signifying above, beyond.

Hyperplasia, the abnormal multiplication or increase in number of the tissue elements.

Hyperplastic, pertaining to or characterized by hyperplasia.

Hypo-, a prefix denoting a lack or deficiency; also a position under or beneath.

Hypophysis, any process or outgrowth, especially the pituitary body.

Hypoplasia, defective or incomplete formation.

Infantilism, a condition in which the characteristics of childhood persist in adult life. It is marked by mental retardation, underdevelopment of the sexual organs, and sometimes by dwarfness of stature.

Infectious, an infectious disease is one caused by parasites, such as bacteria, protozoa, or fungi, and it may or may not be contagious.

Infundibulum, a funnel-shaped extension of the third ventricle extending through the hypothalamus to the end in the pituitary body.

Liter, a unit of measure in the metric system. It is 1,000 c.c. and nearly equals a quart.

Medulla, the central part or core of a gland, as of the adrenal gland.

Menopause, the period when menstruation normally ceases; the change of life.

Metabolism, tissue change; the sum of all the physical and chemical processes by which living organized substance is produced and maintained (substance metabolism or anabolism), and also the transformation by which energy is made available for the uses of the organism (energy metabolism, katabolic m., or catabolism).

Myxedema, a disease, probably due to hypofunction of the thyroid gland, and marked by dropsy-like swelling, especially of the face and hands, smallness of the thyroid gland, slowing of the pulse-rate, dryness and wrinkling of the skin, falling of the hair, dulling of mental activity, sluggishness of movement, and retardation of the rate of basal metabolism.

Necropsy, a post-mortem examination: autopsy.

Nephritis, inflammation of the kidney.

Norm, a fixed or ideal standard.

Orchitis, inflammation of a testis.

Organism, any organized body or living economy; any individual animal or plant.

Orthopnea, inability to breathe except in an upright position.

Ovaritis, inflammation of an ovary.

Oxidation, state of combining with oxygen.

Parenchyma, the essential or functional elements

of an organ as distinguished from its stroma, or framework.

Parturition, the act or process of giving birth to a child.

Pathology, that branch of medicine which treats of the essential nature of disease, especially of the structural and functional changes caused by disease.

Pinguescence, obesity.

Placenta, the round, flat organ within the uterus which establishes communication between the mother and child by means of the umbilical cord; it secretes two or more hormones.

Polysarcia, corpulence or obesity.

Puberty, the age at which the reproductive organs become functionally operative.

Pulmonary edema, an effusion of serous fluid into the air-vesicles and interstitial tissue of the lungs.

Renal, pertaining to the kidney.

Syndrome, a complex of symptoms; a set of symptoms which occur together.

Theelin, an ovarian hormone in pure crystalline form.

Thyroxine, an active principal in hormones of the thyroid gland.

Vertigo, dizziness; giddiness; disorder of the equilibrating sense, marked by a swimming in the head; a sense of instability and of apparent rotatory movement of the body or of other objects.

Viscid, sticking or adhering and having a ropy or glutinous consistency.